GAS JOURNAL

Light · Heat · Power · By-Products

Founded in 1849 as the "Journal of Gas Lighting"

VOL. CCXXI

JANUARY TO MARCH, 1938

LONDON:

WALTER KING, LTD.,

11, BOLT COURT, FLEET STREET, E.C.4

1938

GAS JOURNAL, JAN. 5, 1938

VOL. 221. 90th YEAR. No. 3894.

Mutatis Mutandis

For us who are steeped in the traditions of Thomas Greaves Barlow, of W. B. King, of Walter King, of 11, Bolt Court, of a "JOURNAL" of a shape which had seemed so immutable, it has been a wrench. For several years we have given the matter anxious consideration. We have discussed what the traditions of these men, of these things, have meant to the Gas Industry; we have postponed time and again the making of a change which nevertheless we felt was inevitable.

For those not born and bred in these traditions the decision would doubtless have been less difficult. They would have argued that the Gas Industry's problems, its news and its views, are not by any means of the same nature as they were ninety years ago, and if the Journal had not adapted itself by evolution to modern needs it would long since have ceased to be regarded by the Industry as its representative technical organ. "Would you," they might well ask, "attend the Institution Meeting clothed in the fashions of Barlow's day? Would you put a 1938 motor engine into an 1898 body?"

This is the view which we, too, have felt to be the right one. We are convinced that the tradition which the Gas Industry values lies far deeper than any concern as to the exact page size; that it rests rather upon the manner and style in which the "JOURNAL" continues, decade after decade, to present the Industry to itself, to other industries, and indeed to the world. With such thoughts our last hesitation has disappeared. We can no longer justify any clinging to traditional externals at the risk of giving the impression that the Industry we represent is anything but entirely up to date. And so we offer our first issue of the New Year unchanged in nature, but clothed in the garments which restlessness and change have made fashionable in 1938.

Those to whom history makes appeal can read in other pages of this issue something of the stages of development which since 1847 have successively given to the Industry the *Gas Gazette*, the *Journal of Gas Lighting*, and the "GAS JOURNAL." Most of us, it is true, are concerned rather with the affairs of to-day than of even ten years ago; yet it is not without interest that, among the thousands of technical trade papers which are published, the Gas Industry possesses the second in seniority. In view of the fact that the "JOURNAL" has so continued as an integral part of the Industry for almost the whole of that Industry's existence, the present intimate connection with its affairs and organizations is not surprising. It is unnecessary here to catalogue the services for which "official" gas depends year after year upon the "JOURNAL"; the fullness of our reports is acknowledged on all sides. It is not always realized, however, to what extent the ideal of maintaining for the Industry a first-rate technical paper has involved us, in these post-war years, in extra weight to carry. National bodies and technical associations have increased in number, so also have the frequency of their meetings and the popularity of open discussion. District association transactions grow year by year, and the so-called "juniors," whom we helped into this world and have encouraged to the best of our ability ever since, increase every year not only in wisdom, but in the volume of the knowledge which they impart by way of addresses and papers.

It is recognized that a paper of the nature of the "JOURNAL" is essential to the well-being of the Industry, both for the internal purpose of disseminating information among its members, and in the wider cause of its prestige as a highly technical organization and a leading public utility. It is therefore in no complaining sense that we make these references to the sometimes arduous nature of the work which we do for the Industry. Rather do we feel honoured at the rôle for which we are cast by long custom, and which we have sustained, if we may venture to suggest it, by assiduous attention to the sound lines which belong to our part. We take this opportunity of assuring the Industry that, in spite of our gayer apparel, we have no intention whatever of abandoning our steady and sober methods which have long been regarded as trustworthy and reliable—to the undoubted advantage of gas—in circles which few of our readers suspect. If at times our way may seem unexciting, our consolation is that nevertheless the Industry undeniably has need of us.

In thanking the Gas Industry for the confidence it has placed in us for so many years, it is our great pleasure to make special reference to our advertisers. It is not always realized to what extent the production of a trade paper is dependent upon advertisements, and it would shock many of our readers to know how much they would have to pay for one copy of the "JOURNAL" without any. The manufacturers of plant and appliances have always been foremost in recognizing the value of the "JOURNAL" to the Industry of which they form so important a section, and we ask our readers to give them full credit for the big share they take in making our paper a worthy representative of the gas profession. The general artistic merit of our advertisements is a high tribute to their designers; for buyers within the Industry they are essential information; for the prestige of gas their bulk is eminently satisfactory. Particularly must we make mention of our new front cover, which according to modern style carries one displayed advertisement. Out of regard for those who have used the space for small announcements for many years the new arrangement will this year be in alternate weeks only. But subsequently we shall bow not only to the dictates of fashion, but to the demand which is already manifest for the best available space offering for gas advertising, and adopt the system weekly.

Of our new type what need we say? Or of the new paper upon which we are printed—of the finest quality practicable for this class of work? We can surely leave them to speak for themselves without fear of criticism of any kind. And so, with our first issue of 1938, we present our best wishes to the Gas Industry for continued and enhanced prosperity.

W. R. K.

Editorial Notes

Looking Forward

THE dawn of a New Year seems to engender in mankind the desire for retrospect. We look back over our trials, disappointments, and triumphs in the year. We wish each other a Happy New Year, and we wish it for ourselves with peculiar zest. For those who are engaged in industry, however, this annual reckoning is not sufficient; the events of the immediate past must be regarded as experience from which our future conduct should be derived, and above all we must look forward to the problems that are likely to beset us during the coming year. The efficient business man will not confine his examination of the future to the New Year; it is an everyday practice with him. Nevertheless, the majority of us are so immersed in the daily round of routine that we are prone to devote all our energies to keeping the wheels going round, without finding time or opportunity to think where those wheels are taking us. It is not a bad thing, therefore, to pause at this season of the year to think of these things.

We live in difficult times. There can have been few periods in history when business men generally have so great a need of a cool head, when leadership of the highest calibre was so necessary, when the conduct of affairs was so truly a man's task. Our ship is never far from dangerous waters, and in this we do not refer to the Gas Industry specifically, but to British industry in general. An unstable political world in which dictators of the right and the left shake mailed fists, make speeches which fifty years ago would have led to war within a matter of hours, or engage in intense underground propaganda to shake British prestige, is not conducive to business stability. Those who venture into the troubled waters of international trade to-day require even more courage than the Merchant Venturers of the Middle Ages. The return of their cargo meant wealth, and their business was to that extent a gamble. The modern business equivalent, the maintenance of steady trading conditions, leads to no fortunes, but only to the payment of steady and reasonable dividends. The risks of international trade seem to-day to be no less than in the Middle Ages, especially when we remember the number of nations that spent the season of peace and goodwill in open hostilities, in writing bellicose notes, or in delivering provocative speeches. This is not politics; it has a direct bearing upon the future of the Gas Industry, for the Industry depends to some extent for its business upon the prosperity of every other industry in the country. However wisely we manage our business, we and other public utility industries can do little more than hold our own unless there is general prosperity.

There has been a disturbing undercurrent of pessimism of late, whispers of a coming depression, murmurs of an ebbing of the tide of trade. If those rumours were true, we should have to expect some diminution in the output of gas. The year 1937 has witnessed an increase in gas consumption of some 4½%, and there has been no sign of diminishing activity. Undoubtedly the American trade slump has made some people here nervous; it is equally true that in the engineering trades the possibility of a reduction in the price of steel has caused the placing of orders to be delayed. Prices seem to be at their peak, and the steel industry has announced stabilization till January, 1939. There are many who believe that at that date prices will decrease rather than increase, and buyers, among them gas undertakings, are avoiding placing orders until the last moment because they expect to get better prices.

Those who can confidently look forward to wanting no plant for a matter of five years or so may well withhold their orders for the present. We believe it is unlikely that prices will fall in the near future, and it is quite certain that deliveries will not be much quicker for a long time to come. It is no longer possible, for example, to place an order for a large gasholder in the early spring and expect it to be working in time for the peak load of the coming winter; orders placed during the spring of 1938 will be more likely to be in time for the peak load of the 1939-1940 winter. It is necessary for the Industry to look farther ahead than usual in placing orders for new equipment. We believe that no gas manager should take the slightest notice of this talk of a slump in trade. It might be that it is not without foundation, but no gas manager worthy of his job would withhold orders for equipment urgently wanted to meet peak loads on the ground that "someone" had told him that the coming winter was likely to be mild. He would make his preparations for a severe winter. So we must make our preparations for another 5% increase in gas consumption. To withhold orders is one of the surest ways of engendering trade depression. We do not believe this talk of slumps; with the greatest possible emphasis the Prime Minister has lately declared that such talk is not only exaggerated, but dangerous, and that this country is in a far better position to meet any temporary decline of trade than at any time since the war. The re-armament programme—which, however, is not responsible for much of the trade improvement—is likely to be in full blast for another four or five years. International arrangements are being made which will increase the flow of trade between countries and should make overseas trade less hazardous. We have dealt with this aspect of the coming year at some length because it has a profound bearing upon the future prosperity of the Industry and upon the policy to be pursued by gas undertakings. There is every ground for optimism.

Cost of Gas

THE reorganization of the electricity industry is unlikely to make any considerable difference to the bulk of gas undertakings. The output of electricity in thermal units is far less than that of the Gas Industry, and no amount of re-organization can make any real difference to the cost of current at the consumer's meter, though in isolated instances there will be a reduction where an inefficient company is modernized. Sufficient people have had experience of all-electric houses and of electric cookers to make the true facts begin to be known. Every gas manager has experience of people who have been stampeded into electricity by fashion, the advice of friends, or the "persuasion" of a fatherly town council, but who have come back to gas. A body of experience is growing up among the consumers all over the country which is tending to replace fashion and the craze for novelty by decisions based on sound facts and common sense. The more this spirit can be fostered, the better it will be for the Gas Industry, and the fact that it exists is another cause for optimism. Nevertheless, rural companies may be hard hit by the electrical re-organization, and it would appear that this is an instance where the holding company can be peculiarly valuable. The expert advice, the assistance of

skilled engineers and salesmen with wider experience, and above all the financial support, may prove the salvation of many smaller undertakings.

Gas is used because of its utility and of its economy. In ease of application and in labour-saving characteristics, gas has no advantages over electricity. Both have advantages over coal. The users of coal, however, are generally among the poorer classes of the community, who must watch every penny of their weekly expenditure. For the Gas Industry there are two problems. One of these is to hold what it has won; however successful we are in doing this, we can never do more in this direction than maintain the *status quo*. The second problem appears to us to be the more important, because success in this involves success in the first problem. It is no less than the expansion of the use of gas. We publish in this issue an article on "The Future Orientation of the Gas Industry" by a well-known member of the Gas Industry who desires for the present to remain anonymous because he feels that the subject should be discussed impersonally. The Author declares that there is an immense field open for expansion to the Gas Industry in the domestic market for gas, but that this field depends upon supplying gas to the public at a price which will enable gas to be used in place of raw coal. The Author believes, moreover, that the success of the work of the semi-technical or non-technical salesman depends upon the success of the gas engineer in devising methods whereby the required cheapening of gas can be made effective, and he puts forward a suggestion as to one way in which he thinks it might be done. It may well be that the discovery of means for the reduction in the selling price of gas to enable the all-gas house to become practical politics will be the major problem of the Gas Industry in the future.

This brings us to another problem in the carbonizing field—that of coke. Coke is at present the most successful gas salesman in the country. There must be many among our readers who have experience of business negotiations with local authorities in regard to installing gas or electricity in new housing estates, and who have found themselves at a dead end in their advocacy of gas until the idea has occurred to them of installing a combination of gas and coke appliances. To-day, it is already possible for coal to be completely displaced by the products of the Gas Industry in most districts having a well-managed gas undertaking. The use of the open coke fire is becoming ever more popular, and every one of these fires is fitted with a gas poker for ignition. Many closed coke boilers are similarly fitted. It has been said that a gas poker is as good as a gas cooker from the gas undertaking's point of view, and there is no doubt that the gas poker is as potent a salesman for gas as is the all-mains wireless set for electricity. In our view the Industry might do many worse things than undertake a national campaign to sell gas pokers for every solid fuel grate in the country, whether burning coal or coke. A great many people do not yet know that such an appliance exists. Perhaps we are too busy trying to enter at the front door to remember that the easier way in is often at the back.

Future of Coke

THE value of coke to the Gas Industry during its present stage of development must keep us alive to the dangers which lie ahead. When we have discovered the method of making gas at such a price that it can displace coal completely, we shall not want coke. The Author of the article to which reference has just been made, however, appears to agree that it will always be necessary to make some coke, so long as any known or foreseeable methods of gas manufacture are used. Complete gasification at reasonable prices is impossible to-day unless we are content to distribute producer gas of 130 B.Th.U. or so—and that would involve high distribution costs and other difficulties, besides which the value of coke as a residual would be lost. It seems to be a fact that we must anticipate for long producing a proportion of coke for sale. The dependence of the cost of gas-making upon the selling price of coke is considerable. If, for example, a works is obtaining 80 therms of gas per ton of coal used, and sells 10 cwt. of coke, it can readily be calculated that if the coke sells at 20s. a ton the cost of gas-making is reduced by 1·5d. a therm purely from the sale of the coke, while if the coke be sold at 40s. per ton, the effect on the cost of gas is 3d. a therm. These figures are striking and significant. They show first of all how great must be our pre-occupation with the coke market. They show secondly that our costing systems are subject to the disadvantage that the cost of gas-making as determined in the usual way is subject to adventitious circumstances which have nothing to do with the efficiency or otherwise of the works.

The importance of the coke market has been recognized during the past year. The total additional coking capacity now being installed in the country is very large. The totals of orders placed for plant in this country during the past four years have been: in 1934, 7,620 tons of coal per day; in 1935, 7,134 tons; in 1936, 6,090 tons; and in 1937, 6,654 tons—a grand total of 27,498 tons, or approximately equivalent to the annual production under practical working conditions of 6,000,000 tons of coke a year. It is not to be expected that all this coke will be thrown upon the market as additional domestic fuel if a slump occurs in the iron and steel industry. Much of this tonnage is built to replace obsolescent ovens. Actually just over 40% of the foregoing tonnage represents new plant carbonizing coal not carbonized before. Apparently these new ovens will increase the amount of oven coke on the domestic market by a maximum of 2,400,000 tons above that of 1933-1934. Many new batteries are likely to be ordered in the next three or four years. The absorption of this additional coke will not be difficult provided proper provision is made for investigation and development work such as that now conducted by the London and Counties Coke Association. The coke oven interests have set up coke marketing organizations in most districts, and these work with the local gas undertakings to some extent. It cannot be denied, however, that as at present constituted these are mere price-fixing organizations. The Gas Industry has intimated its willingness to co-operate with these bodies, and one of the greatest of our problems of 1938 is to ensure that co-operation and to get the coke oven interests to assist the Gas Industry in the development work necessary to extend the present uses of coke and to find new uses.

Gas-works must continue to pay attention to the quality of the coke they produce. The recent report of the Fuel Research Board, for example, emphasized again that high temperature cokes that were satisfactory for use in the open grate when dry might be entirely unsatisfactory when wet, by reason of the increased heat needed for ignition and of the lower rate of radiation when burning. The need for keeping coke dry is thus evident. There may not be quite the same need for coke used for closed boilers to be dry, but consumers object to paying good money for water, and it must not be forgotten that the coke oven product is centrally quenched and frequently contains a maximum of 1 to 2% of water. Gas coke must be no worse in this respect than competitive fuels. This fact will make the Industry

chary of cleaning coke in the future by removing the dirt by floating in water. The Coal Mines Bill, however, may make it difficult for the Gas Industry to obtain the necessary supplies of clean coal. It may be found that many works will be supplied with relatively high ash coal, and that either the coal or the coke must be cleaned. There are reasons against cleaning the coal at the gas-works, though these may disappear should the need become urgent, just as the arguments against heating retort settings by coal gas instead of coke have recently disappeared in some works. If it is inexpedient to clean the coal, and it is inadmissible to wet the coke, an alternative technique must be found. Experience shows that coke can be successfully cleaned by the dry-cleaning methods that have been developed for coal cleaning. We published an account of some work in this direction just four years ago ("JOURNAL" for Dec. 20, 1933). The pressing need appears to be for an appliance of this character suitable for the smaller works. Every possible precaution must be taken in the future not only to keep gas coke dry, but also to keep its ash content at the minimum.

Coal and By-Products

COAL is likely to continue to be one of the pre-occupations of the Gas Industry in 1938. The price increase by some 5s. or 6s. a ton in 1937 has been serious enough, but even more serious is the fear of unfair competition due to the powers that seem likely to be given to the coal trade. The public utility industries are likely to be the buffer which will take up the shock whenever conditions cause the coal trade to desire more revenue or a change in the selling of coal. A great danger is that the coal trade will attempt to perpetuate the burning of raw coal by keeping down the price of house coal while at the same time raising the price to the public utility industries and to those making smokeless fuels. That has already happened. Undoubtedly, we do not want Government-fixed prices; prices must be flexible enough to admit of variation with industrial conditions. But the prices of all coals should be raised simultaneously, if at all, and in a proper ratio. The view has been expressed that the Bill in its present form will gravely prejudice all coal-using industries, and it will be one of our greatest problems in the coming year to get proper treatment in the matter of coal supplies.

By-products other than coke present less urgent problems than those just discussed. Ammonia disposal is still to the fore, and although good results were reported by Mr. Holton at the Autumn Meeting of the Institution, it hardly appears that this system is likely to come into general use on account of the cost of transport. The use of automatic liquor concentration plants will perhaps provide the key to the solution of the ammonia problem—that the concentrated liquor should be worked up in central, but not far-distant, ammonia works. These works need not be confined to the production of sulphate of ammonia, or, indeed, of ammonia at all. Nitric acid and its derivatives might be produced from the ammonia. The establishment of a few central works of this character, perhaps by arrangement with the chemical industry proper, may well be one of our future problems. It may be that the coming year will see progress made in the direction of producing ammonium bicarbonate at gas-works, using the carbon dioxide contained in the gas as the acid radical. The I.G. Farben-industrie have pointed out (B.P. 474,164) that ammonium bicarbonate is usually too small in crystal size and is unstable partly for this reason and partly because the inclusion of mother liquor rich in ammonia. It is stated that large and stable crystals can be induced by introducing into a solution of ammonium bicarbonate, saturated at atmospheric temperature and which already contains ammonium bicarbonate crystals, a solution of normal ammonium bicarbonate and carbon dioxide gas in such amounts and so slowly that the crystal nuclei already present or freshly formed are able to grow to the desired crystal size, the solution being kept cool. It seems from this example quite possible that further research might enable ammonium bicarbonate to be placed upon the market.

The authorities are not satisfied that the Gas Industry is recovering as much benzole as it might do. Unquestionably there are many gas-works that do not yet recover benzole, and many of those which do so only recover half or two-thirds of the total quantity present. No doubt the reason is the difficulty of adjusting the declared calorific value to the benzole content of the gas, but there are some who believe, not without reason, that it is better to declare a lower calorific value and to remove all the benzole.

The Gas Industry has many interesting problems confronting it in the coming year, some of them technical, some commercial, and others political. There is need for sound and resolute leadership; there never was so obvious a need for courage in steering our ship through the rock-strewn waters that lie ahead, but there are the clearest indications that there is a great future for the gas and allied industries if we grasp our opportunities.

A Broadcast Appeal

On Sunday, Feb. 6, a B.B.C. "Week's Good Cause Appeal" will be on behalf of the National Smoke Abatement Society. The Appeal will be made by Dr. Julian S. Huxley and will be broadcast on the National Programme at 8.45 p.m. The Appeal is, of course, a valuable opportunity for the Society not only for funds but for making the need for smoke abatement more widely known. The Society will shortly be issuing cards or labels relating to the Appeal, for attachment to letters, and so on. We suggest that gas undertakings should co-operate with the Society in the use of these labels. Everything possible should be done to ensure the success of this Appeal.

As we go to press we learn that the Society has convened a conference of local authorities, which will be held at the County Hall, Westminster, on Feb. 25. The conference will be opened by Lord Snell, Chairman of the London County Council, and the chief speaker will be Dr. J. S. Owens, Superintendent of Observations for the Investigation of Atmospheric Pollution, of the Department of Scientific and Industrial Research. The general discussion will be begun by Mr. E. H. Keeling, M.P., who will suggest the appointment of an Advisory Regional Smoke Abatement Committee for Greater London. Mr. W. A. Damon, Chief Inspector of Alkali Works, representing the Ministry of Health, will also speak.

Address to Juniors

The presence of Mr. George Dixon, Junior Vice-President of The Institution of Gas Engineers, at the joint meeting of the Eastern and Western Districts of the Scottish Junior Gas Association is evidence of the interest which the parent body takes in the affairs of the Juniors; and the Address which he gave on that occasion—it will be found on later pages—is full of sound advice. Modern gas making conditions demand a higher standard of technical supervision, and the junior members of the Industry in charge of plant have to embark upon a lengthy course of training to attain the high standard required. Mr. Dixon suggests that at the end of this training many of those who have been successful in all the examinations are apt to regard themselves as gas engineers, and are inclined to forget that it is necessary to qualify equally well in the application of the knowledge obtained through studentship. In this connection it is necessary to cultivate powers of observation to ensure that plant is working at its best efficiency. There is a definite margin between the best managed

and the indifferently managed works, and the junior can do much to eliminate this margin. Retort house control and the many routine jobs which come within his province are important aspects of works management, and shortcomings in this direction are usually due to the feeling that all is well, when the exercise of a critical faculty would often present the picture in quite a different light. There are many instances where the efficiency of a plant is allowed to fall which could be prevented by the technical ability possessed by the average junior, if thoughtfully applied.

Personal

In the New Year Honours List appears the name of Dr. J. W. MELLOR, F.R.S., lately Director of the British Refractories Research Association, who has been awarded a C.B.E.

* * *

Mr. R. OSMOTHERLEY has been appointed Manager of the Silloth (Cumberland) Gas Undertaking, which is owned by the Wigton Rural District Council.

* * *

Sir FRANCIS GOODENOUGH has resigned from the office of Chairman of the Council of the British Association for Commercial and Industrial Education, and has been elected an Hon. President.

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Mr. T. P. BUTCHER has resigned from the position of Distribution Superintendent, Burnley Gas Committee, and has been succeeded by Mr. H. SHACKLETON, Second Assistant Engineer, to that office.

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Mr. W. E. BOWERS, Secretary of the Imperial Continental Gas Association, retired as from Dec. 31 after forty-two years' service. The Assistant Secretary, Mr. C. S. W. HARRISS, has succeeded him.

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Mr. R. HUGGETT was presented with a clock by the employees of the Edenbridge and District Gas Company on his retirement on pension after 45 years' service. Mr. Huggett's son is the Engineer, Manager, and Secretary of the Brightlingsea Gas Company.

* * *

The engagement was announced on Monday between Michael, younger son of Sir David and Lady Milne-Watson, of 73, Eccleston Square, S.W., and Ashley Chase, Dorset, and Phœbe, only daughter of Mr. and Mrs. Archibald Orr-Ewing, of 70, Chester Square, S.W.

* * *

His many friends will be glad to learn that Mr. J. H. CANNING, O.B.E., J.P., Engineer and Manager of the Newport (Mon.) Gas Company, is making good recovery from injuries sustained in an accident on Oct. 5 last year. He hopes shortly to resume his normal duties.

* * *

The Managing Director of Sulzer Brothers (London), Ltd., Mr. J. F. SCHUBELER, M.I.M.E., D.I.E.H., after many years' association with the Sulzer interests, has resigned his seat on the Board of this Company. Mr. R. M. ATKINSON, formerly of Vickers, Ltd., has been appointed to succeed him.

* * *

On the occasion of his retirement from the position of Manager of Haddington Gas Company, the employees have presented Mr. JAMES BLAIR with a suitably inscribed gold watch. The presentation was made by Mr. Thomas Gaffney. Mr. Blair suitably thanked the employees for their kind gift.

* * *

Mr. WILLIAM VERITY, who took up his new duties as Engineer and Manager to the Newton Abbot Gas Company on Jan. 1, was the recipient of presentations from the Directors, staff, and employees of the Weymouth Gas Company, of which he has been a member of the staff for the past fourteen years.

* * *

We offer congratulations to Mr. R. S. SHAPLEY, A.R.I.B.A., son of Mr. C. S. Shapley, upon a recent success in his profession. From a list of nominees submitted by the West Yorkshire Society of Architects, he has been appointed by the Leeds Gas Committee to prepare and submit the necessary plans for the provision of additional storage and office accommodation at Bridge Street Depôt.

Radiation Limited

Deputy-Chairman Appointed

Mr. J. F. Davies, Chairman and a Managing Director of John Wright & Company, of Birmingham, has been appointed Deputy Chairman of Radiation Limited. From the formation of the latter Company, Mr. Davies has been one of its Managing Directors.

Obituary

Mr. ARTHUR FORBER, who died a few days ago at the age of sixty-two, was the son of the late John Forber, who was Manager of the Connah's Quay Gas and Water Company. Upon his father's death in 1904, Mr. Forber became Manager of the Company and held that position for 32 years, retiring last year.

* * *

We regret to announce the death of Mr. H. H. HOARE, Engineer and Manager of the Falmouth Gas Company, on Dec. 26. He had served the Falmouth Company for thirty-three years.

The following members of the Cornish Gas Association were present at the funeral, which took place on Dec. 29 in the presence of a representative gathering of townspeople: Messrs. S. J. Ingram and R. J. Williams (Truro), R. Morton (Dorchester), W. J. Couch and E. S. Buckley (Camborne), N. A. Langford (St. Ives), H. Richards (Redruth), and F. G. Kingwell (Falmouth).

"GAS JOURNAL" Directory

Addenda and Corrigenda

Page 12. Burgess Hill—add *AG.
" 24. East Surrey (and Associated Gas and Water Undertakings)—telephone now Redhill 3201.
" 50. Newton Abbot. W. VERITY appointed E. & M.
" 62. Silloth. R. OSMOTHERLEY appointed M., *vice* A. S. BRUSH.
" 72. Wellington, Salop. H. J. WOODFINE is now M.D. & S.; C. H. WOODFINE is E.
" 80. Comrie—delete S. MACPHERSON, S.
" 92. Stewarton. A. MILLER, S., deceased.
" 100. Delete BRUSH, A. S., Silloth.
" 105. Delete "MACPHERSON, S., Comrie."
" 106. Add OSMOTHERLEY, R., Silloth.
" 106. Delete MILLER, A., Stewarton.
" 109. Add VERITY, W., Newton Abbot.
" 110. Add WOODFINE, C. H., Wellington, Salop.
" 132. Mordialloc—make should be 54·5, consumers 2,990.
" 136. I.C.G.A. C. S. W. HARRISS appointed Secretary, *vice* W. E. BOWERS, retired.

The Irish Gas Industry

Census Figures

Preliminary figures of the census of industrial production in the Irish Free State for 1936 show that in the Gas Industry the total value of the goods made and the work done was £1,128,155, compared with £975,331 in 1931. The total cost of materials used in the Industry rose from £408,075 in 1931 to £452,538 in 1936, and the value of the net outputs of the two years were, respectively, £564,608 and £672,098. At mid-Oct., 1936, there were 2,235 people employed compared with 1,916 at the same date in 1931. Salaries and wages paid in 1936 amounted to £91,645 and £291,927, respectively, compared with £75,338 and £251,784 in 1931.

Gas Price Increases

During the week further announcements have been made in regard to small increases in gas prices necessitated by the successive and substantial rises in the costs of labour and materials. Three London Companies have announced an increase of two-fifths of a penny per therm—the South Metropolitan Gas Company, the South Suburban Gas Company, and the Wandsworth and District Gas Company. The last named Company controls the Woking District Gas Company, which is similarly affected. It was pointed out that there has been a rise in the price of materials of between 10 and 15%, and of about 6% in the cost of labour, and that the increase in gas price represents for the average domestic consumer an addition of less than one penny per week, and is thus well below the general increase in prices. The new prices in the main areas supplied by the three Companies are: South Metropolitan, 9·4d.; South Suburban, 9·9d.; Wandsworth and District, 8·6d.

The Romford Gas Company has raised the price from 8·7d. to 9d. per therm.

News of the Week

H.R.H. the Duke of Kent will visit the Birmingham section of the British Industries Fair on the morning of March 1.

Gas for Public Lighting has been decided upon by Broughton (Lincs.) Parish Council in competition with electricity.

Charitable Contributions by the employees of the Glasgow Gas Department's Provan Works during the past year to various City institutions amounted to £238.

The Introduction of Coal-Selling Schemes will cost the Nottingham Gas Department an additional £40,000 a year, it was reported at a recent meeting of the Gas Committee.

The Lighting Committee of Aberdeen Town Council on Dec. 28 agreed that gas be used for the lighting of Middlefield estate, thus reversing a previous decision in favour of electricity.

A Site at the corner of High Street and Buchanan Court has been recommended for sale to the Gas Department at a price of £2,250 for the erection of a gas showroom by a sub-committee of Falkirk Town Council.

An Application from the Gas Department for powers to borrow £180,000 over four years was granted at a meeting of Dundee Gas Committee on Dec. 20. The sum is for certain works and buildings at the Gas-Works.

Applications for the Position of Engineer and General Manager at a salary of £1,000 per annum are invited by the Napier Gas Company, New Zealand. Particulars will be found in the advertisement columns of this issue.

For a Supply of Gas, Leicester Gas Committee has been petitioned by Newbold Verdon, Leicestershire, and Barleston, Warwickshire. The Committee is considering the matter, and adjoining authorities are also being consulted.

"Odorized" Gas is now being supplied by the Clayton (N.M.) Gas Company, America. Notices have been sent out by the Company requesting consumers to report unusual odours at once. This move is stated to have been made in anticipation of a law requiring it.

The Roads Department of Devon County Council invites tenders for the supply, for the twelve months ending March 31 next, of coke, refined tar, bitumen, and bituminous or tar-bitumen compounds, &c. Tenders on the forms provided have to reach the Clerk to the Council not later than noon on Jan. 19.

Objection Has Been Lodged by the Billingham-on-Tees Urban Council with the Board of Trade against the making of a Special Order applied for by the Stockton Corporation authorizing the Corporation *inter alia* to extend their limits of supply. The Billingham Council instructed their Clerk to negotiate with the Corporation.

With Commendable Opportunism the Sheffield Gas Company have for some years now secured the front cover advertisement on both those excellent annual industrial supplements published by the Sheffield *Daily Independent* and the *Sheffield Telegraph*. This year they have repeated their success and, as usual, the supplements include articles on industrial gas.

Records Have Been Broken at Middlesbrough and Newcastle-upon-Tyne during recent weeks. A new record day's output has been established at Middlesbrough, where the figure of 5½ million cu.ft. has been attained. This represents an increase of 23% over the corresponding day of last year. At Newcastle new records have been set up for both the daily and weekly outputs.

The New Showrooms and Offices of the Liverpool Gas Company in Bold Street, to be called "Radiant House," will be opened on Jan. 24 by the Right Hon. Oliver F. G. Stanley, M.P. The Directors have invited 1,800 co-partner employees and their friends to a carnival dance to be held on the evening of the opening day. The Lord Mayor and the Mayors of neighbouring Boroughs have been invited to the opening.

The Staff of the Houghton-le-Spring District Gas Company held their third Annual Dinner on the evening of Wednesday, Dec. 22, in the Colliery Hotel, Hetton-le-Hole. Mr. J. Tindale (Foreman) was in the Chair, and Mr. G. W. Martin (Manager) was also present. The entertainment, which included a sketch, was again provided by members of the staff. At the close a hearty vote of thanks was accorded to the Directors of the Company for kindly contributing towards refreshments.

The Employees of the Aberdeen Gas Department on Dec. 24, Mr. Samuel Milne, Engineer and Manager, presiding, decided that £55 be allocated to Aberdeen Royal Infirmary and £25 to the Royal Aberdeen Hospital for Sick Children from the Department's Charitable Institution Fund. It was also decided to allocate smaller sums to various other local charitable institutions.

From the Copper Development Association, Thames House, Millbank, S.W. 1, we have received an extremely informative book entitled "Copper in Cast Steel and Iron," which deals exclusively with the influence of copper additions on the properties of cast steel and cast iron. Other applications of copper and its alloys are dealt with in separate publications which are listed in the book. Any of these can be obtained free from the Association.

The Progress of the Canadian Gas Industry is shown by figures issued by the Canadian Gas Association. The amount of manufactured gas sold during the year ended March 31, 1937, was 16,577 million cu.ft., an increase of 67 million cu.ft. The amount of natural gas supplied during the same period was 30,291 million cu.ft., an increase of 956 million cu.ft. The number of meters recording manufactured gas sales was 507,113, while for natural gas the figure was 169,132.

A Programme of Special Courses to be given in the Department of Coal Gas and Fuel Industries with Metallurgy of Leeds University is mentioned in our advertisement columns this week. These courses are in the Manufacture of Coal Gas, Refractory Materials, Disposal of Waste Liquors Produced in Gas-Works and Coke Ovens, and Engineering Metallurgy. Among the lecturers are Mr. R. Dally, M.Sc., Mr. F. J. Dent, Ph.D., Mr. H. Hollings, M.Sc., A.I.C., Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C., Mr. A. L. Roberts, Ph.D., Mr. A. Key, Ph.D., and Mr. A. Preece, M.Sc.

A Glimpse into the Future will be provided by an exhibition organized by the Mars (Modern Architectural Research) Group, which will be opened at the New Burlington Galleries on Jan. 11. The exhibition seeks to answer the two pressing social questions of how can our changing needs in every form of life be met and can the pressing problems of transport, housing, health, and amusement be solved by a new architecture. A skeleton section of a house, rather on the lines of an X-ray photograph, will show how present-day requirements of heat, light, power, refrigeration, and ventilation are met.

A £38,000 Reconstruction Scheme is proposed at Perth Corporation Gas-Works. The project has been approved by the Gas Committee, and is likely to be considered at a special meeting of the Council at an early date. Principal items in the scheme are the installation of a new bench of vertical retorts at an estimated cost of £34,000, of benzole recovery plant at a cost of about £3,000, and dry gas plant estimated to cost £1,230. Proposal is that eight new vertical retorts should be added. At present there are 40, giving the plant a margin of 10% on the production required to satisfy the city's consumption.

Letter to the Editor

Consumption per Consumer

SIR,—I was intensely interested to read your review of the future prospect of the Gas Industry for 1938 and on, and particularly your reference to the effect of the dwindling birthrate on future business.

I wish to suggest that the success of the Gas Industry should be gauged by the extent to which the requirements of all existing consumers, domestic and industrial, have their heat requirements satisfied by the Industry.

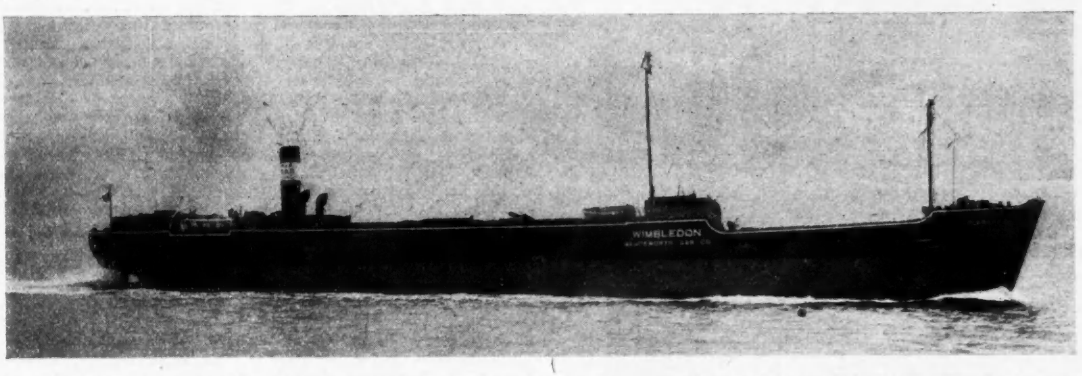
Increased consumption per consumer is much more creditable and financially sounder than an increased number of consumers depending on an increase in the population, which might conceivably, and for the time being, reduce the purchasing power of the breadwinners.

But, to be more serious, as I see it, the most important aim of the Industry should be to increase the consumption per consumer on financially sound lines. With this I am sure you will agree.

Yours, &c.,
E. W. SMITH.

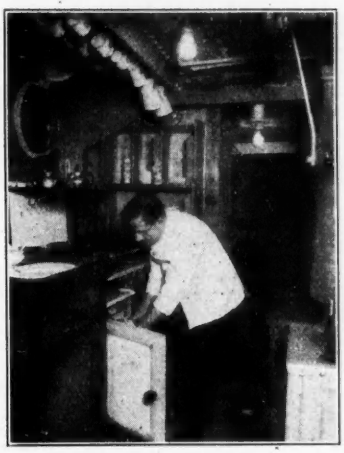
Dec. 30, 1937.

Largest Up-Thames Steamer Completes First Trip



Last Sunday morning the Wandsworth and District Gas Company's new collier, the S.S. "Wimbledon"—the largest up-Thames steamer—completed her first trip, bringing 2,343 tons of coal from the north-east coast. The occasion was marked by an "official reception" of the new vessel and a triumphal escort from Limehouse to Wandsworth.

Reference was made in the "JOURNAL" for Dec. 8 to the launching from the shipyard of the Burntisland Shipbuilding Company, Ltd., of the Wandsworth and District Gas Company's new 2,500 ton dw. collier, s.s. "Wimbledon," when particulars were given of this largest up-Thames steamer. Twelve vessels have been built by this firm for the Company.



The Galley, where the Cooking is done by Gas.

On Sunday morning the new vessel completed her first journey from the north-east coast, bringing 2,343 tons of coal, and she was welcomed at Limehouse by a party of shipbuilding experts, gas engineers, and others, who accompanied her by tug on the final stage of her voyage to the wharf at Wandsworth.

Ships travelling as far up the river as Wandsworth have many difficulties to encounter. There are 18 bridges to clear, and when the tide is low there may be insufficient water to proceed with safety. There is no straight path between the arches of the various bridges. These factors have been taken into consideration in producing the "Wimbledon." The principal dimensions of the ship are: Length b.p., 250 ft.; breadth, 39 ft. 6 in.; depth moulded, 18 ft. 6 in.; deadweight, 2,500 tons; gross tonnage, 1,598; net registered tonnage, 820.

The modern triple-expansion steam propelling machinery has been supplied by Messrs. Aitchison Blair, Ltd., Glasgow. The engines have cylinders 16½ in.—28 in.—47 in. × 33 in. stroke. Steam is supplied at a pressure of 200 lb. per sq.in. from a boiler working under a controlled system of forced draught. The upper structure of the vessel is so designed that only the funnel and stokehold ventilators require to be hinged, while the foremast telescopes into a tube and the aftermast hinges down when passing under bridges.

She is capable of a speed of over 12 knots, and can turn in a circle of about twice her own length. The rudder is operated by telemotor gear supplied by Donkin & Co., Ltd., of Newcastle-upon-Tyne, and can be swung from full port to full starboard in 12 seconds.

They cook by gas in the "Wimbledon." There is a special type of stove which burns "Calor" gas supplied from portable containers. The ship is equipped with a radio-telephone supplied by Siemens Brothers & Co., Ltd., so that the Company can communicate with Captain W. G. Tickner on his voyages.

After the "Wimbledon" had tied up at the Wandsworth wharf Mr. C. M. Croft (Chief Engineer and General Manager of the Wandsworth Company), who, with Mr. Wilfred Ayre, was responsible for the design of the new vessel, entertained a large gathering at luncheon. Among those who were toasted were Captain Tickner, the Master of the ship, and his crew, and Captain W. G. Lockey, the pilot.

Malta and Mediterranean Capital

A special meeting of the Malta and Mediterranean Gas Company is to be held on Jan. 18 to consider resolutions that the special resolutions for reconstruction of capital and for distribution of £24,730 10s., part of "capital reserve account," which were passed at the extraordinary general meeting held on Nov. 2 be rescinded.

It is proposed that, in order to solve a technical difficulty, £1 per share be paid up from reserve on the 3,000 shares issued at a discount of £1 and the shares converted into stock.

The capital is to be reduced from £150,000 to £100,770, in 4,385 Second Preference and 1,000 Ordinary shares of £5, and £18,000 First Preference, £10,845 Second Preference and £45,000 Ordinary stock, by returning £2 for every £5 of the stocks held.

It is proposed that the capital be then increased to £150,000 by the creation of 9,846 new Ordinary shares of £5 and £24,730 10s. (part of capital reserve account) be distributed among the stockholders registered on Nov. 1, 1937, as capital. The Preference stockholders will receive 14s. for every £5 of stock and the Ordinary stockholders 24s. for every £5 of stock.

An American Cousin of Mr. Therm

A Versatile Character

This is the newest member of the gas symbol family. He hails from America and was invented, designed, and copyrighted by Mr. Edward Galloway, of Key Building, Oklahoma City. Although seen here as a refrigerator, he turns readily into a range, water heater, or heating plant. Our picture, together with these details, is reproduced from *Gas Age*.

Gas at "News Chronicle" Schools Exhibition

The Exhibit of Radiation Ltd.

There is a special Gas Hall at the *News Chronicle* Schools Exhibition which will be running at the Dorland Hall, Regent Street, S.W. 1, until Jan. 12. This exhibition is the first comprehensive educational exhibition of its kind in this country, and in a practical manner it covers every phase of up-to-date physical and mental education.

Grouped around the British Gas Federation information bureau are the exhibits of the Gas Light and Coke Company and various manufacturers of gas appliances and equipment. Ascot Gas Water Heaters, Ltd., provide an interesting and attractive display of water heaters suitable for installation in schools to cope with many specialized requirements. The range includes multi-point, sink, and boiling water heaters, all in operation for practical demonstrations of their capabilities for supplying lavatories, cloakrooms, pavilions, nurseries, &c., with instant unlimited hot water. The decoration of the stand mainly consists of striking photographic murals appertaining to schools, children, and their health as affected by hot water, while the safety and simplicity of "Ascot" appliances are graphically portrayed by the same means.

The Gas Light and Coke Company are showing typical gas equipment for a London County Council school, including a Cannon "Challenge" glass-door cooker, "Electrolux" refrigerator, "SnoWhite" thermostatically-controlled drying cabinet, "Ascot" multi-point water heater, and "Phantom" ironing set, among the advantages claimed for which are that there is no flame in the iron when working and there is no risk of burning delicate material.

On the stand of Messrs. Thomas Potterton [Heating Engineers], Ltd., are some examples of their range of automatic gas-fired heaters for low-pressure hot water warming and hot water supply. These include "Rex" and "Victor" gas-fired boilers for central heating; the "Spiral" boiler, with balanced flue arrangement for greenhouse heating; the "Rex," "Empire," and "Emperor" for direct hot water supply; the "Emperor" thermal storage set; and the "Empire" lagged storage set.

Radiation Ltd., are showing up-to-date gas cooking equipment, suitable for use in school kitchens. This equipment includes a "Grosvenor" single unit range, "Regulo"-controlled "New World" ranges, high-speed "Savoy" griller, pedestal type octagonal boiler for vegetables, stews, and general purposes, "Belgravia" hotcloset, carving table and Bain Marie combined; new pattern steamer for vegetables, fish, and puddings, "Causeway" single pan fish frying range, and solid top "Grosvenor" hotplate on low stand with "Chester" oven at side. The last is specially designed for use by children in cookery classes, as the flames on the hotplate are enclosed to eliminate the possibility of their clothes catching fire. Educational authorities should be interested in batteries of appliances such as these which have been designed to lessen labour, to increase the output, and to improve the standard of cooking by their thermostatic control.

Other exhibitors of interest to the Gas Industry are Ideal Boilers and Radiators, Ltd., and Turners Asbestos Cement Company.

In the Conference Hall, among many other features of interest, gas publicity films are shown from time to time, the Nutrition Film being introduced by Professor Julian Huxley, M.A., D.S. These sessions are arranged by the Gas Light and Coke Company.

"Space-Heating" Becomes "Direct Heating"

With the recent change in name of the Gas Space Heater Division of the Association of Gas Appliance and Equipment Manufacturers, states the *American Gas Association Monthly*, a movement is under way in the Gas Industry to substitute and popularize the use of the term, "direct heating" in place of what has heretofore been described as "space heating." This change in terminology has considerable support within the Industry, where the term "space heating" has caused considerable confusion in the past.

When the regulations for testing gas appliances were originated, a name had to be selected to cover the large group of heating appliances other than boilers and furnaces. The name selected was "space heaters." It took many years before this term was in general use in the trade that was involved in selling gas heaters. Outside of the profession directly concerned, the term has never been accepted.

Architects, builders, and engineers usually use the term "space heating" to designate the heating of any given space, whether it is an office building or a modest dwelling. They use the term regardless of the type of equipment and the method of heating. It appears logical that such use of the term "space heating" is the correct use. Certainly it is well known that in the Gas Industry much time and many needless words have been spoken and written in efforts to explain what "space heating" means.

During the past several years some portions of the Industry have been using the terms "direct heating" and "direct heaters" to cover this field. These terms have attained considerable acceptance. In marketing circles the use of the words "direct heating" has aroused new sales interest. The word "direct" means a lot in a sales sense, as it immediately suggests simplicity and efficiency.

It is suggested that the Gas Industry generally should adopt the term "direct heating" and take steps to standardize its use in describing a distinct form of heating for which gas is the ideal fuel.

The Industry's Oldest House Organ in New Form

It is gratifying to note that co-incident with the improvements in the Industry's oldest technical journal, its oldest house organ —the *Co-partnership Journal* of the South Metropolitan Gas Company—has assumed a new and more attractive "dress."

With the Christmas issue the *Co-partnership Journal* celebrated its thirty-fourth birthday, and no better way of marking the occasion could have been chosen than the introduction of these improvements in its form and layout. We have before us as we write copies of the old and new editions, and the two most obvious changes are the enlargement of the page width to a more convenient "quarto" size and the adoption of a cheerful red cover—with the "Contents" clearly set out on the front and "Coming Events" listed on the back. But the improvements are by no means confined to such superficial changes, excellent as they are. A new and modern type face had been chosen, in twin-column make-up, together with bolder headings and a more effective use of blocks rendered possible by the new page size. In addition to a seasonable message from the President, personal notes, and Sports Association news, the issue contains articles of general interest, Service Notes, Company News, and a section devoted to cross-word puzzle, acrostic, and problems.

It may be said without fear of contradiction that the South Metropolitan *Co-partnership Journal* is moving abreast of the times. We wish it all success in the continuance of its good work in the cause of co-partnership, and we congratulate the Editor upon the improvements which will assist towards that end.

In our issue of Sept. 1 last we published an article under the title of "Treatment for the Prevention of Holder Discoloration" which we erroneously acknowledged to the Canadian Gas Association *Messenger*. We offer our sincere apologies to the Colonial Gas Association, of Melbourne, who have kindly pointed out the slip to us in the last mail to hand. Their *Messenger* is of course well known to us, as well as the significance of the letters C.G.A.

Forthcoming Engagements

Jan.

7.—**I.G.E.**—Joint Committee on Complete Gasification under Pressure, 16, Old Queen Street, S.W. 1, 3 p.m.
8.—**Scottish Eastern Juniors.**—Visit to Milne's Meters, Ltd., Edinburgh.
10.—**I.G.E.**—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.
11.—**I.G.E.**—Council Meeting, 10 a.m.
12.—**I.G.E.**—Meeting of Board of Examiners, 2.30 p.m.
13.—**Midland Juniors.**—Meeting and Paper by A. T. Green.
15.—**Scottish Western Juniors.**—Debate meeting.
15.—**Yorkshire Juniors.**—Meeting at Leeds. Paper by W. S. Hubbard, "Choice of Gas Storage."
17.—**L.C.C.A.**—Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.
18.—**I.G.E.**—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.
18.—**London and Southern Juniors.**—Meeting and Paper by R. T. d'Eyncourt, "Load Value of Appliances as a Guide to Sales Policy."
19.—**B.C.G.A.**—Executive Committee, 11.30 a.m.; General Committee, 2.30 p.m., Gas Industry House.
20.—**S.B.G.I.**—Council Meeting, 2.30 p.m.
22.—**Western Juniors.**—Meeting at Weston-super-Mare. Paper by A. G. Holtham, "Rural Gas Services."
27.—**Midland Juniors.**—Visit to Docker Bros., Paint and Varnish Manufacturers, Birmingham.
28.—**I.G.E.**—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
29.—**Scottish Western Juniors.**—Visit to Glasgow Corporation Lighting Department.

Feb.

1.—**I.G.E.**—Research Executive Committee, 2.30 p.m.
2.—**London and Southern Juniors.**—Visit to Watson House.
3.—**Midland Juniors.**—Meeting and Paper by G. Bakewell, of Birmingham, "The Sale of Coke for Domestic Purposes."
5.—**Scottish Eastern Juniors.**—Short Paper Meeting at Dunfermline.
5.—**Manchester and District Juniors.**—Meeting at Blackpool. Paper by T. V. Blake, "A Six Years' Period Prior to the Removal of Blackpool Gas-Works."
8.—**I.G.E.**—Finance Committee, 10 a.m.; Membership Committee, 11 a.m.
12.—**Scottish Western Juniors.**—Meeting and Paper by E. Smith, of Dumbarton, "Stores Control and Job Costing."
15.—**I.G.E.**—Gas Education Executive Committee, 2.30 p.m.
15.—**London and Southern Juniors.**—Meeting and Paper by E. W. B. Dunning, of the Gas Light and Coke Company, "The Relation of Design to Cooking Quality."

Institution of Gas Engineers

International Gas Union.

The Reports, publications Nos. 1-5, and the Transactions, publication No. 6, of the 2nd Congress held in Zurich in 1934, are available at a price of 3s. each and the complete set of all five Reports and the Transactions for 16s. 8d.

The Reports, publications Nos. 7-17, and the Transactions, publication No. 18, of the Congress held in Paris in 1937, are being sold at a reduction of 10%—that is, at 2s. 9d. each.

Publication No. 19, the Gas Industry Vocabulary, is published at 24s. per copy.

The complete set of these Reports (Nos. 7-17), together with a copy of the Transactions (No. 18) for 1937, and one copy of the Gas Industry Vocabulary (No. 19) are offered for £2.

Of these Reports the following were presented by members of the Institution:

No. 3.—"Methods for the Development of the Use of Gas for Domestic Purposes," by Mr. C. Valon Bennett.
No. 13.—"Technical Service for Gas Consumers," by Mr. R. N. LeFevre.
No. 14.—"Electrolytic Corrosion of Gas Mains," by Mr. H. C. Widlake.

Orders for any of these, together with a remittance, should be sent to the Secretary of The Institution of Gas Engineers.

Gasholder Record Sheets.

The Gasholder Record Sheets referred to in the 4th Report of the Gasholder Committee of The Institution of Gas Engineers, together with standard loose-leaf binders to accommodate them, are now available.

These Record Sheets have been prepared for the use of gas undertakings in connection with the inspection of Water-sealed and Piston-type (Waterless) Gasholders. It is believed that the keeping of Records in this standard form will be of assistance to gas engineers both for information and in connection with visits from Factory Inspectors, and it is urged that these Record Sheets be adopted by all gas undertakings.

In preparing these Records the Gasholder Committee of the Institution considered, from its experience, that they include all items of importance in connection with the external inspection of water-sealed gasholders, and cover all the requirements in this respect of Clause 33 of the Factories Act, 1937.

Sheets and binders and particulars as to their price can be obtained from the Secretary of the Institution.

Members of the Institution will be welcome at a Meeting of the Illuminating Engineering Society on Tuesday, Jan. 11, at 6.30 for 7 p.m., to be held at the Lighting Service Bureau of the E.L.M.A., 2, Savoy Hill, Strand, W.C. 2. Light refreshments will be served at 6.30 p.m.

A Paper will be read at the Meeting by Mr. R. O. Ackerley on "Decorative Materials and their Response to Light."

Tickets for this Meeting can be obtained from the Secretary of The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1.

The "Ascot" Christmas Party

The above group was taken at the fifth annual Christmas party of Ascot Gas Water Heaters, Ltd., to which we referred last week. The Christmas Tree which stood 20 ft. high in the centre of the hall was laden with presents which were afterwards delivered, according to custom, to the children's section of the Willesden General Hospital. The presentation which we mentioned was made to Dr. Bernard Friedman consisted of a bound set of volumes of the works of Charles Dickens.

Famous Airwoman Presents Prizes for Cake-Making Competition

Our photograph shows Miss Jean Batten presenting an "Ascot" sink water heater to one of the winning competitors. In the centre is Mr. Lewis Silkin, Member of Parliament for the Peckham Division.

Miss Jean Batten at Peckham

So great was the success which attended the "Thousand Cakes Competition" organized a year ago by the South Metropolitan Gas Company and Holdrons, of Peckham, that a similar competition was held this year, the prizes for which were presented by Miss Jean Batten on Dec. 21.

Once again great interest was taken in this event by housewives—not only in Peckham but in all parts of the Company's extensive area of supply—and no fewer than 1,076 cakes were entered. A cherry cake had to be made to a specified recipe in a gas cooker, and the entries were judged by Mr. J. K. Gawith, of Messrs. J. Lyons & Co., Ltd., who stated that a very high standard of cooking had been attained. It is interesting to record that the first prize was originally awarded to a 73-year-old retired baker who, noting that the conditions did not stipulate that competitors must be women, thought he would see whether, after many years of retirement, his hand had "lost its cunning." Evidently it had not—and it is a tribute to the judge that out of over a thousand cakes he should have singled out the entry of a professional baker. However, when he learnt that he had won the first prize, the baker, with true chivalry, once again "retired" and left the field open for the lady competitors.

All the entries were displayed at Holdrons' premises in Rye Lane, Peckham, prior to the prize-giving, after which they were presented to the Salvation Army for distribution to needy people by way of a Christmas gift. Fifty useful prizes and a similar number of consolation awards were given by the South Metropolitan Gas Company and Holdrons, and it may be mentioned that the winners came from the older rather than from the younger generation. Among the "gas" prizes presented by the Company were the following, all of which included free fixing: An "Ascot" sink water heater, a "Denola" square-top enamelled gas copper, a "Metro" gas fire (finish to be selected by winner), a "Metro" portable heater, a "Nocturne" portable heater, a "Rayflex" portable heater (the last three appliances all complete with tubing and plug), enamelled gas irons, and gas pokers.

In connection with the competition a series of demonstrations was held in the "Gas Showrooms' Kitchen" at Holdrons, which were well attended.

The Prize Distribution.

The presentation of the prizes by Miss Jean Batten proved an enormous attraction, and even the usual crowds which throng this popular shopping centre were dwarfed to insignificance by the thousands who gathered both inside and on the pavements outside Holdrons to catch a glimpse of the popular airwoman whose epic flight from Australia thrilled so many people not long ago. It was indeed a red letter day in the lives of the winners to receive their prizes from the hands of so famous a figure, and the charming way in which she presented them delighted the recipients as much as the prizes themselves.

The South Metropolitan Gas Company, who are to be congratulated upon the considerable part they played in this splendid publicity effort, were represented at the ceremony by Mr. F. G. Brewer (Secretary) and Mr. A. B. Seton (Gas Sales Manager), while the gathering was also honoured by the presence of Mr. Lewis Silkin, the local Member of Parliament.

Miss Batten was introduced by Mr. Gordon Selfridge, Jnr., who referred to her recent magnificent achievement. He also expressed appreciation of the South Metropolitan Gas Company's co-operation in helping them to organize the competition. Miss Batten, who was given an enthusiastic reception, said how pleased she was to be present on that occasion to distribute the prizes, and expressed her surprise at the large number of entries for the competition, on the organizing of which she congratulated Holdrons and the Gas Company. It was wonderful to think that there were so many women in the district capable of making such wonderful cakes—which, she added, she would have been very glad to have with her on her recent flight when breakfast, lunch, tea, and dinner had to be taken in the air. Miss Batten went on to describe a few of the incidents of her recent flight and concluded by paying tribute to the kind thought which prompted the organizers to give the cakes to the Salvation Army for charitable purposes.

Following the distribution of the prizes, Mr. Lewis Silkin expressed gratitude to Holdrons and the South Metropolitan Gas Company for arranging the competition. Though he might not always have seen eye to eye with the Gas Company in certain directions, they had played their part in this competition in a very public spirited way. He knew something of the work of the Company, for in his capacity of Chairman of the L.C.C. Housing Committee he was responsible for something like 80,000 tenants of council dwellings, and he knew the great care which the Company took to satisfy their consumers and provide them with the very best fuel. They were all proud and honoured to have Miss Batten with them on that occasion, and once again he thanked the two firms for the trouble they had taken in organizing the competition. He wished them all success in the future.

Mr. F. G. Brewer thanked Miss Batten and Mr. Silkin for their presence. In regard to the latter's reference to the provision of Council dwellings, he agreed that the South Metropolitan Company had aims which ran on parallel lines to Mr. Silkin's in that they were providing a service which helped to make home a real home. They were always proud and happy to do anything they could to co-operate with the authorities. Mr. Brewer also thanked Holdrons for the facilities provided to co-operate with them.

The proceedings were brought to a charming conclusion by the presentation to Miss Batten by three-year-old Margaret Preston of a bouquet, which the former acknowledged by wishing everyone present a happy Christmas and successful New Year.

A Novel Christmas Display

This attractive Christmas window display was arranged by the City of Leicester Gas Department for the festive season.

Research - - -

Research is one of the live questions of 1938. Particularly in our Industry is it exercising the minds of all thinking men—its trends, direction, execution, and future possibilities are being discussed on all sides. We have been fortunate in obtaining, in the following succinct message, the views on the subject of Mr. E. V. EVANS, O.B.E. The work already accomplished by the South Metropolitan Gas Company, of which Mr. Evans is General Manager, includes, of course, a vast amount of pioneering research. His many years contact with it have well qualified him for his present position as Chairman of the Institution Research Executive Committee.

You ask me to write about Research, and in particular about Research of The Institution of Gas Engineers. On several occasions recently I have spoken of the work that has been undertaken at the University of Leeds on behalf of the Institution and have tried to give some indication of the objects the Research Executive Committee have set out to achieve. We are rapidly approaching the stage when, in my opinion, our efforts will need more substantial support than can be given by verbal encouragement, and a critic of our procedure might say, with some justice, that at the present moment we are doing a little too much talking and achieving too little.

There is a school of thought in the Institution which holds the opinion that the amount of research carried out under its guidance is seriously inadequate. Of this there is little doubt, but the inadequacy is in quantity and not in quality. The activities of Prof. Cobb and his able assistants deserve our admiration, and Dr. Dent in particular is to be congratulated on work of a high order of excellence. I think it will be agreed that any money devoted to investigation at Leeds is well spent.

One has but to read a few numbers of the "GAS JOURNAL" of, say, thirty years ago to be made aware of the fact that the Industry has made enormous progress. To-day we have a much clearer conception of what we are doing when we subject coal to heat treatment in closed vessels. Our consumers' appliances have been brought to a state of high efficiency.

However much we have achieved, there is still much to be done. The study of the fundamental principles underlying the design and efficiency of appliances should be carried out in a much more vigorous manner than at present. Again, if oil is to be made from coal in large quantities in this country —and every effort should be made to make the nation self-supporting in this matter—the Gas Industry is best qualified to carry out this task. Investigations in recent years clearly show the way. Coal can be treated now in such a manner as to give only gaseous and liquid products, and by hydrogenation the latter can form the raw material of a home-produced oil industry.

From time to time it has been pointed out that the efficiency of conservation of energy of the coal substance in the Gas Industry is of a high order, and the case recently made by Sir David Milne-Watson at Manchester upon the value of our Industry to the nation could be studied with advantage by our statesmen and politicians.

Excellent as are the achievements of to-day, the fact remains that there is yet much to be done.

E. V. EVANS.

Amalgamation and Grouping

Newcastle-upon-Tyne and South Shields

After 113 years, South Shields Gas Company ceased to exist on Dec. 31, and the undertaking now belongs to the Newcastle-upon-Tyne and Gateshead Gas Company.

When application was made for a Special Order to the Board of Trade for the amalgamation of the two Companies objections were lodged by the Town Councils of South Shields and Jarrow and the Urban Councils of Hebburn and Boldon, all of which were in the area of supply of the South Shields Company. The objections of the local authorities have been met and the Order has lain for the prescribed period on the table in each House of Parliament without opposition. The Order therefore has now taken effect.

Mr. W. A. Armstrong, Vice-Chairman of the South Shields Company, becomes a Director of the Newcastle Company; the other Directors of the South Shields Company and the Secretary (Mr. A. Pickering) have retired and will be compensated for loss of office. Employees with three or more years' service with the Company will be compensated if dismissed because of reorganization. It is understood that extensive reorganization will probably be considered in the near future, but for the time being the South Shields Works, offices, and showrooms will be maintained and the services of the employees retained. The present charges will continue until the reorganization scheme has been carried out, but ultimately it is understood the Directors hope to standardize the charges for the whole of their area of supply.

Stellite, Ltd., and Llandudno.

Members of the Llandudno Urban Council were urged at their last meeting by the Acting Chairman of the Gas Committee not to delay giving their approval to the sale of the Gas Undertaking to Stellite, Ltd., otherwise the deal would not go through in the current financial year.

Councillor R. J. Gresley-Jones said if the deal for the sale of the gas-works were to go through for £107,000, less certain sums, the gasholders of Llandudno would for ever stand as a monument to their stupendous folly. The outstanding loan on the Undertaking twelve months ago was £130,000, but by using their sinking fund of £43,000 and the revenue of £2,600 derived during the year they had reduced that outstanding loan to about £82,000. The position was getting better and better every day, and in a few years' time he felt confident that the Council would be able to clear their debt. Rhyl had refused to sell, so had Colwyn Bay and Bangor.

Mr. Arthur Hewitt said he was not concerned so much with the purchase price as the immediate benefit to both consumers and ratepayers. A reduction of 4½d. per 1,000 cu.ft. of gas and a reduction of 3d. in the rates were tangible benefits. This was a sound business transaction that should be carried out in the interests of the ratepayers.

The draft agreement of sale was approved.

Athletic and Social

Cardiff Children's Christmas Party.

As in past years, children of employees of the Cardiff Gas Light and Coke Company were given a Christmas entertainment by the Company. It was held on Dec. 29 at the Drill Hall, Cardiff, when children up to the age of seven were guests at a tea.

The Engineer and Manager of the Company (Mr. H. D. Madden) and the Secretary (Mr. R. J. Auckland) attended. The arrangements were made by the Entertainments Committee of the Company's Athletic and Social Club, of which Mr. F. Boardman is the Chairman and Mr. B. J. Bell Vice-Chairman, each of whom were present. On the following day elder children received a similar treat.

Children of the Company's employees have been fortunate this year. In the summer, as part of the Company's centenary celebrations, the younger ones were entertained at the Grangetown Gas-Works Recreation Ground. The elder children were taken to the Bristol Zoological Gardens.

Leven Girl's Success.

First prize for the most original costume at a local Christmas Eve Fancy Dress Carnival was awarded to Miss Ritchie, an employee of the Vale of Leven Gas Company. Her costume emphasized the slogan "Cook to Time with Gas."

What Does the Public Think of You?

How often does the ordinary member of the public give a thought to the Gas Industry? How does he—or she—feel towards it? Does he think that the Industry is keeping pace with the times or that it is old-fashioned? In this article an observer tries to estimate the public's reaction to current trends in gas propaganda.

IT is probable that you, like most other readers of the "JOURNAL," hold a responsible position in the Gas Industry. Before you got your present job you had to go through the usual mill, serving the long and exacting apprenticeship which the Gas Industry, like other professions, regards as an essential training for its executive officials. Ever since you left school or college you have been up to the chin in gas affairs. As a young man you probably spent a good deal of your spare time in working for professional examinations and attending business meetings and discussions. Promotion and responsibility have served only to intensify your preoccupation with professional matters. You have to keep pace with unprecedented advances in technical and commercial practice. You have to produce increased sales in a period when competition is hardening and social conditions and habits are changing with bewildering rapidity. You scrutinize the methods used in other districts and even in other countries to see if they can be successfully applied to your own undertaking. You attend meetings of the Institution, of the B.C.G.A., of district Associations; you discuss the Papers presented, you swap ideas and experiences with other gas men. "Talking shop," to the average gas man among his fellows, is more than a pastime; it is a positive duty if he is to keep touch with current developments. An Industry like yours, composed of several hundred units like your own, in each of which one or two men are mainly responsible for initiating and conducting policy, needs frequent assemblies and discussions between its members if a consistent level of progress is to be kept. There is a good deal to be said for this system of free co-operation between independent units. It helps to build up a common front and to establish common standards between you and your colleagues in other parts of the country without sacrificing individual initiative and local methods which have proved their worth. On the other hand, the system absorbs a good deal of your own time and that of your fellow members; and by ceaselessly concentrating attention on the specific problems facing the Industry it may well result in a narrow outlook on questions of more general import. The more passionately and completely you are interested in your own business, the less you are able to view it from the standpoint of a cool and impartial observer. This applies with particular force to you as a gas man, because the processes of mastering your job and handling it with confidence and success have demanded a single-minded devotion which is comparatively rare in other professions. The habit of judging everything from the Gas Industry's point of view has become second nature to you in the conduct of your business; but it is a fatal handicap when you try to estimate the public's opinion of you and your trade.

You Don't Know What They Think.

What does the public really think about the Gas Industry? You don't know, though you like to think that you know. Your salesmen, canvassers, fitters, and meter readers who are in daily contact with ordinary small consumers could give a more accurate answer than you, though they too, if they are worth their salt, are far from being impartial, their reliability as transmitters of public opinion being impaired by their natural loyalty to their own trade. You yourself are saturated in the traditions of the Gas Industry—and they are worthy traditions. You know the part played by the Gas Industry in the economic life of the nation; you know the value of its work for the community; you know its immense possibilities. And knowing these things, you expect the general public to know them too, and are puzzled or dismayed when you are confronted with an instance of prejudice against gas or of favouritism for its competitors.

Do You Take Yourselves Too Seriously?

The fact is that the general public thinks very little about the Gas Industry, except when the Gas Industry's work is thrust prominently before their notice. But it is probably true to say that the general public to-day thinks a great deal more about gas than it ever did before. The reason is chiefly that the Gas Industry has begun to present its case to the public more sympathetically, more persistently, and with a surer touch. Not long ago a northern Town Councillor, speaking at a gas function, rallied the members of the Gas Industry for taking themselves too seriously. Now it is no fault to take your business seriously; but it is a commercial crime to allow the public to think that you are pompous, smug, or priggish in the conduct of your business. Rightly or wrongly, this impression of the Gas Industry was at one time prevalent. It was reinforced by the latent British prejudice which exists against all public bodies, which are always open to the suspicion of being nests of bureaucracy, red-tape, officialdom, formalism, and all the accessories of the Circumlocution Office. In dispelling that impression from the public mind, no one factor has been more effective than the appearance of Mr. Therm.

Mr. Therm and the Tradesman.

Though Mr. Therm is approaching his fifth birthday, it is doubtful whether the Gas Industry as a whole appreciates as yet his full effect on the public. He demolished the not uncommon idea of the Gas Industry as an old gentleman who had come down in the world and who had become a tradesman under protest. When Mr. Therm came in at the door, the old gentleman clambered goutily out of the window and disappeared for ever. Mr. Therm had a way with him, too. He was frank, gay, confident, even a trifle cocky; and in this he reflected the temper of the Gas Industry which, after feeling a bit sore at the completion of the Grid, was beginning to fight back with increasing success. The Gas Industry had been the first national industry to advertise co-operatively; indeed, the B.C.G.A. owed its beginnings to the fact that advertisements inserted by a London company in London newspapers were read all over the country. Other co-operative bodies, including the electrical industry, had followed the example of the B.C.G.A., some of them carrying bigger guns in the shape of heavy advertising appropriations. But with the appearance of Mr. Therm the Gas Industry regained its lead; it presented itself to the public in a new light as a spirited and adventurous body, confident enough of its appeal to make jokes while it made sales. There are thousands of boys and girls growing up to-day (consumers-to-be in the less populous England of to-morrow) to whom Mr. Therm is as familiar as Peter Pan and a good deal more real. Even among the more serious of their elders Mr. Therm has taken his toll of admiration; the *New Statesman* and the *Architects' Journal* have noted him as a portent, and letter-writers in the *Observer* have called him in evidence. His successes have never ceased to intrigue the advertising community, whose members depend for their existence on their skill in presenting their clients' goods in the most seductive way. It is a tribute to Mr. Therm that he has often been imitated. It is a greater tribute to his creators that even the hardiest and most persistent of his imitators has never rivalled him in popularity.

The Showroom and the Moated Grange.

So much for Mr. Therm in the newspapers. Mr. Therm At Home, and receiving visitors, is another matter; for his home is the gas showroom, and sometimes he is indifferently housed. This is by no means the fault of the present generation of gas men. It is obviously far easier to make a radical change in your advertising than to make a radical change in your showrooms, which probably represent a considerable

investment and come to you as a legacy from the past. In spite of this, a large number of gas undertakings in recent years have taken their courage in both hands, and remodelled or rebuilt their showrooms to bring them into line with twentieth century ideas. They recognize that a business is judged by its premises just as surely as a man is judged by his appearance. There are still plenty of gas showrooms to-day which recall the romantic preferences of a past generation: showrooms in the Tudor style, in the Jacobean style, in any style but the modern. To look at them you would think that the salesmen hovering behind the bottle-glass panes must be dressed as Elizabethan varlets, and that the demonstrators in the old raftered halls must be tripping about in farthingales and stomachers, cooking the venison on a spit. These buildings neglect the first duty of a showroom, which is to attract people inside; for all the success they achieve in this direction, they might as well be provided with a moat, drawbridge, and culverins. They are monuments to the wayward fancy of a past age, and fit only to be ranked with the oddities of architecture like Forthill Abbey, Sham Castle, or even Hatter's Castle. That they are now in a rapidly declining minority is to the credit of the Gas Industry. Most of the gas showrooms built in the last few years really succeed in conveying the impression that they belong to a modern business which has plenty of new and interesting things to show and will give a friendly welcome to visitors. As for the cash value of a modern showroom on a good site, any doubter should refer first to undertakings which have built new premises in new suburbs on the outskirts of London. A talk with the housewives of the district will convince him of its psychological effect.

Gas in the Market Place.

Showrooms can do a great deal to put your public in a favourable frame of mind; but they have their limitations. Within a small radius of any gas showroom, however attractive and inviting it may be, you will easily find gas consumers who have lived in the district for years without ever setting foot inside the showroom. Yet they are not necessarily poor prospects for sales. This has been proved time and again by undertakings which have organized house-to-house canvassers. It has been proved also by undertakings which rent a stall in the local market for the sale of small appliances and fittings; they make sales to customers who have never been in the showrooms, which may be only a stone's throw away. These, above all, are the customers who need the human touch in selling; indecision or inertia protects them from the impact of advertised offers, sales displays, and circulars, though each may have its effect on their general attitude; but to be brought to the point of doing business they need the direct friendly approach of the salesman on their own ground. It is not impossible that in their reluctance to enter the showrooms there is some trace of the prejudice which stirred a journalist some years ago to denounce the "icy Duchesses and tinpot Hitlers" of the gas offices. That reproach can no longer be levelled against the showroom staff. There is no false gentility in the attitude of the Gas Industry towards its customers to-day. It follows them to their homes. If they live, metaphorically, on the Mountain, the gas Mahomet comes to them in his exhibition van. In some districts the shy housewife may even find a full-dress cookery demonstration taking place outside her very door.

Wooing Women.

The use of demonstrations as a means of winning public goodwill has been developed rapidly in recent years. So many undertakings have started Home Service departments that there has been a run on the supply of trained demonstrators and the B.C.G.A. has had to set up an appointments bureau. There is a special significance in the use of those words "Home Service" to cover the activities of demonstrators. It implies a more complete acceptance of the woman's point of view than was ever credited to the Gas Industry in the past. In the old days the Gas Industry was like the heavy father of Victorian melodrama, telling his womenfolk what was good for them and paying no heed to their fads and fancies. To-day, when we listen to gas speakers on the platform, we may well believe that the versatile fellow has shaved his mutton-chop whiskers and cast himself for the juvenile lead, diverting all his energies to the study of womankind and the arts of courtship. And this change is not a matter of lip-service only. A tour of the gas demonstration theatres in different parts of the country would show that in this aspect of public relations the Gas Industry has taken a long lead over its rivals. The only doubt that occurs to a casual observer is whether the demonstrations are as well known or as extensively attended as they should be. It is quite common during a long programme of demonstrations to find that the hall has been filled to capacity at each session; but in many such cases there are grounds for suspecting that a large proportion of the audience are "regulars," enthusiastic cooks who never miss a demonstration. The aim should be to attract different audiences for each demonstration. If we were able to get accurate figures showing the percentage of consumers who have never visited a gas demonstration, even in towns where demonstrations are as regular as church services, it is safe to say that many managers would get a shock.

Gas and Nutrition.

Home Service, however, is still in its infancy. We have gained some idea of its wider possibilities from the work which has recently been done by gas undertakings, together with health authorities, in giving practical information on problems of health and diet to the poorer housewives and mothers. Regarded from the standpoint of immediate cash returns, this is a thankless job, and outside the scope of a purely commercial undertaking; but to those who have started the work, the Gas Industry is something more than a commercial enterprise, and the reward for starting socially beneficent work of this kind lies in the appreciation of the small but influential minority of well-informed and active people who are ultimately responsible for the forming of public opinion. It is essential for the Gas Industry's well-being that the people who guide public opinion in greater or less degree—politicians, journalists, local authorities, medical officers, social workers, and others—should have confidence in the public spirit and responsible feeling of those who control the Gas Industry.

Gas Films Without Gas.

It is from this point of view that the Gas Industry's films have a value far in excess of their immediate effect as direct advertising. In each of the three sets of films so far produced there has been one picture treating some national problem of topical importance. In 1935 there was *Housing Problems;* in 1936 the *Nutrition Film;* in 1937 *Children At School.* These three films, which make little mention of gas though they deal with subjects in which the Gas Industry is vitally interested, have been shown by their own request to many influential bodies, including city and county councils, housing societies and groups of research and educational workers. They have roused discussion in responsible papers of all kinds. It is no exaggeration to say that for many serious people these films have put the Gas Industry in a new light by showing it as a body of people whose corporate interests are not limited by narrow commercial concepts.

A Lesson for Housing Authorities.

The film of *Kensal House* is not less important than the others, though it differs from them in being essentially a straight piece of gas propaganda. But then the building of Kensal House itself was a piece of propaganda, being nothing less than a triumphantly successful attempt to prove, in defiance of lazily accepted ideas, that smokeless and genuinely labour-saving homes can be built within the financial limits prescribed for low-cost dwellings, and can be run at a fuel cost which is actually lower than the present fuel budget of the average working-class family; and further, that only the Gas Industry can offer this solution to a problem which had hitherto seemed insoluble. It may be some time before the lesson of Kensal House is fully recognized and accepted, but there is no doubt that it has already roused intense interest among all those who are seriously concerned with the housing problem.

The Art of Seeming Right.

And now to sum up on this question of public opinion and the Gas Industry. There can be little reasonable doubt that

the public as a whole thinks more about the Gas Industry to-day, and thinks more highly, than ever before. In its approach to the public, the Industry has become more human, more friendly, and more confident. Its relations with the well-informed and socially active section of the community have improved a great deal. There is still plenty of prejudice to be worn down, plenty of wrongly accepted ideas to be uprooted. But the Industry has learned that it is itself to blame for the existence of prejudice and misinformation. It has found that there is a complex art for presenting itself in the right light to its customers, and that good public relations can only be built up by conscious thought and hard work.

Ninety Years of Progress

The History of the "GAS JOURNAL"

In order to introduce the changes which we present to our readers with this first issue of the New Year, we trace the developments of the "JOURNAL," from the style and layout viewpoint, from the earliest times until the present day.

An early issue of the "Journal of Gas Lighting."

It is about ten o'clock on the morning of Thursday, Jan. 6, 1938, and, after a cursory glance through his mail, which is uninteresting and consists largely of bills and the customary sprinkling of complaints, the Engineer and Manager of the Blanktown Gas Company picks up the familiar rolled package which arrives regularly each Thursday morning. Deftly he slits up the patent opener—which to his infinite surprise works perfectly—and produces No. 3,894 of the "GAS JOURNAL." He looks at it critically for a moment. There seems to be something unusual about its appearance this week, though he can't quite decide what it is. Ah, yes; the cover—a displayed advertisement—and, indeed, the whole thing seems somehow different. He readjusts his spectacles and turns the paper round. Even upside down it looks different. The E. & M. presses the button on his desk which summons his chief clerk.

"Bring me last week's 'JOURNAL,' will you, please?"

"The auditors have it at the moment, sir."

"No; the 'GAS JOURNAL,' Jones!"

"Oh, yes, sir. Certainly."

A few moments later the chief clerk returns with the previous issue, which he hands to his chief. The E. & M. compares the two numbers carefully, nodding to himself as he does so. "Yes; I thought there was something different. Have you seen it, Jones?"

"Yes, sir. I've just been looking through the office copy. It's a great improvement, don't you think?"

The E. & M. continues to nod appreciatively as he turns over the pages of No. 3,894, comparing the various points of difference. "Yes, Jones," he said, "I agree; it *is* an improvement. A very much better looking paper altogether—and a more convenient size to handle, too. That will be all for the moment, Jones. Oh, will you get me Mr. Prendergast, of the Nextown Gas Company, on the 'phone, please?"

The chief clerk goes out, and the E. & M. returns to his perusal of the new "JOURNAL" with interest, noting with pleasure the various changes which meet his eye.

The coal fire in the office of the Engineer and Manager of the Nextown Gas Light, Coal, Coke, and Lime Company burns dully in the grate, sending little spurts of sulphurous grey smoke billowing out into the room to join that from the ancient pipe of Mr. Prendergast sitting glumly at his desk and thinking unkindly of the world in general. The telephone bell rings, and, with a stifled groan, he picks up the receiver. Another complaint, he supposes.

"Hullo, old man," says the voice over the wire, "Pepperell here."

"Oh; how are you?"

"In the pink. How's yourself?"

"Can't grumble, I suppose, in the circumstances."

"I say, have you seen your 'JOURNAL' this morning?"

"Yes; why?"

"Good, Heavens, man, d'you mean to say you haven't noticed the change?"

"Change? What change?"

The E. & M. raises a protesting hand and waves it in the air as he replies. "Why, the cover, the shape, the size, the type, the layout! Have you no eyes?"

"H'm," mutters his colleague, gazing at the "JOURNAL" on the desk before him. "Yes," he admits grudgingly, "I suppose it does look a bit different. A pity. Sorry to see the old traditions passing."

His colleague apostrophizes the ceiling. "Fiddlesticks!" he retorts, rudely. "It's a sign of the times, man. It's progress! How's your output this week?"

"Down again, I'm afraid."

"I don't wonder. You're hide-bound, old man; that's your trouble. You want loosening up. Read your 'GAS JOURNAL.'"

"Yes; I always do look through the appointments vacant. By the way, now you're on the 'phone, I want your advice about a bit of trouble I'm having on the works. I've got a purifier ——."

"You don't say!" says the E. & M. "I always thought you sent out your gas unpurified."

The foregoing imaginary conversation is an attempt to portray the reactions of two very different types to this issue of the "JOURNAL." The name Prendergast does not appear in our Directory of Engineers and Managers. We hope and believe that the type he represents in this story is well-nigh extinct.

Save upon the few occasions of outstanding anniversaries, the "JOURNAL" has never said much about itself; but there are moments in the lives of all of us when we feel prompted to throw humility temporarily to the four winds and say, "Look what we've done!" And if he only will look, we are confident that even our old friend "Regular Reader" will not shake his head and bewail the passing of old traditions. Traditions are all very well in their place, but after all, as Gibbon said in the "Decline and Fall," history is little more than the register of the crimes, follies, and misfortunes of mankind. On this sobering note, therefore, we turn to the ancient volumes of the "JOURNAL" in order to trace our own crimes and developments, not so much from the point of view of subject-matter itself, but rather from the aspect of how we have treated that subject-matter; how we took advantage of the gradual evolution of types and headings; how we laid out our pages—in short, how we endeavoured to make the paper attractive to the reader and pleasing to the casual glance.

We must, in retrospect, admit that—in company with simi-

lar publications of those early days—there was little or no appreciation of the true significance of these æsthetic aspects of journalism. It might well be assumed that the main object in life of those responsible for the make-up of the papers of that time was to squeeze as much as was humanly possible on to each page—in the smallest of types and with the most insignificant headings. To what extent this was achieved may be judged from the fact that main headings to articles in those days actually occupied no more space than the cross-headings we use in the middle of the text to-day.

The "Gas Gazette."

In order to trace our progress from the aspects just set out, we have called out of retirement No. 1 of our forerunner, the *Gas Gazette and Monthly Advertiser,* which first saw the light of print on Monday, May 10, 1847. In the course of the introductory "Address to Our Readers"—which took the place of Editorial Notes in those days—it was mentioned that, notwithstanding what had been said in a prospectus already issued, it appeared necessary to state in the first number some of the reasons which induced the Proprietor, George Barlow, to embark on the undertaking and some of the benefits which he trusted the public would derive therefrom. The Editor

JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.
GEORGE GLOVER & Co.
IMPROVED DRY GAS-METERS.

The First Page of No. 1,000, July 11, 1882.

JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.
EDITORIAL NOTES.

The Editorial Page of No. 2,000, Sept. 10, 1901.

MISCELLANEOUS NEWS.

A News Page in No. 3,000, Nov. 10, 1920.

best, most perfect, and unvarying instrument for measuring gas, by which means equal justice is done to the Gas manufacturer and Gas consumer." This "instrument" was manufactured by the patentees, Messrs. Croll & Glover, of Suffolk Street, Clerkenwell Green—which sounds as though it was in those days a pleasant country suburb.

These early issues of the *Gas Gazette* contained a few technical contributions on such diverse subjects as "The Comfort, Cleanliness, Safety, and Economy of Gas Lights in Private Houses;" on "Ascertaining the Diameters of Street Mains for the Conveyance of Gas to Places where it is Proposed it shall be Consumed" (it is not revealed where else it should be conveyed); Book Reviews, Parliamentary Intelligence, Lists of Patents and Designs, and a very attenuated list of Stock Exchange prices for gas shares. On the last editorial page was a section evidently intended to whet the appetites of readers for the following issue, comprising a reference to "very interesting communications which will appear in our next number." Among these was "Tricks of Fraudulent Gas Consumers, &c." Unable to fill the column to the extent of three lines and unwilling to "white" out the make-up, the Editor dropped in a laudable, but apparently entirely irrelevant, quotation from Plutarch to the effect that

then went on to state those reasons to the tune of nearly six columns.

The *Gas Gazette,* which had a comparatively short existence, was published on a single sheet (sixteen pages), with three-column pages measuring approximately 10½ by 8¼ in. We suppose we may be counted fortunate in having secured almost two whole pages of advertisements in that first issue, and there again, and for many years after, we see the frantic efforts of "publicity" men of the middle of the last century vieing with each other to push as many words as possible into the extremely small spaces they allotted themselves. For instance, an advertiser of that time drew attention, in a space measuring 1 in. by 2⅛ in., to "A splendid assortment of New and Elegant Patterns of Lamps, Chandeliers, Brackets, Fittings, &c., for Gas, Oil, and Candles now on view, &c., &c." The "displayed" advertisement, however—that is, the announcement containing some form of illustration or other—was the exception rather than the rule for many years to come, though one advertiser, right from the very first issue, illustrated his announcement with an ancient wood-cut of a "Patent Dry Gas Meter"—by Her Majesty's Royal Letters Patent. The smallest (or 1-light) meter of this type was offered at the modest figure of 14s., and the copywriter, following the custom of those bad old days, had no hesitation in claiming categorically that this appliance was "the cheapest,

"Life is most happy where superfluities are not required and necessities are not wanting." For the purpose of filling up a column a more inappropriate quotation, according to modern ideas, could scarcely have been selected. The Editor was evidently *not* a happy man, and this seems to be borne out by the fact that six months later he "walked out" on the Proprietor without, apparently, taking the trouble to give prior notice. The Proprietor was—perhaps justly—indignant, and in the "address" in that issue he said that "it was with more mortification than he could find words to express that he was compelled again to appear in diminished proportions."

There followed immediately after this "address" an advertisement for a new editor, a perusal of which (observed the Proprietor) clearly showed the great improbability of meeting with a competent party *sufficiently disengaged* to undertake the duties. The italics seem to indicate that the post was not intended to be a full-time job. The advertisement itself stated that "To any gentleman thoroughly well acquainted with the business and the science of gas making in all its details, no occupation more entirely agreeable could well be imagined; but to carry on the work successfully it will require great energy of mind and great activity. He will have to attend all public lectures wherever the subject of gas is treated on; to read all papers and works, regularly or

occasionally referring thereto; to become personally acquainted, and in regular intercourse, with the scientific men of the day, and to make himself acquainted with all the proceedings of the legislature relating to gas or interesting to gas proprietors; in fine, nothing must escape him, so that the *Gas Gazette* may take its proper rank in the gas world, and be *relied* upon by all for accuracy of information, for early notices of every matter of interest, however minute; and, when called upon, as an impartial guide to its readers." Indeed, it would appear that the position of Editor was no sinecure. Nevertheless, the words of that advertisement provide an epitome of the aims and objects of the "JOURNAL" from that day to this.

The "Journal of Gas Lighting."

Whether the Proprietor received any applications for the editorship history does not relate, and, indeed, the whole of the following year seems plunged in obscurity. However, on Feb. 10, 1849, there appeared the first issue of the "JOURNAL OF GAS LIGHTING"—published quarterly with an intermediate supplement on the 10th of each intervening month. Thus was the original *Gas Gazette* re-constituted under the Editorship and Proprietorship of Thomas G. Barlow, Civil Engineer, of 32, Bucklersbury, London. There appears to have been no explanation of the sudden production of this new periodical. It jumped straight into its "Circular to Gas Companies"—the Editorial Notes of that time—followed by its "Communicated Articles," its correspondence, miscellaneous news, register of patents, and comprehensive share list, just as though it had been publishing for years without a break.

The "JOURNAL," we have every reason to believe, can claim to be the second oldest trade paper in the country—if not in the world—and in those early days its production, good as it may have been by the standards of the time, bore an appearance which to-day would be regarded with something akin to horror, or possibly mistaken for an unusually abstruse governmental document. The mere sight of it might well cause even our die-hard "registered reader" to shudder and cancel his subscription or the advertiser to shrug his shoulders and seek fresh fields without further ado. For headings we favoured a somewhat illegible "Old English" type of a kind now rarely seen save on Christmas cards, illuminated addresses, and long-service certificates, while the text columns —reminiscent of the House of Commons during a full-dress debate—exhibited an almost fanatical reluctance to leave the smallest amount of space unoccupied. The paper was published on a page more nearly resembling in size that which we have just abandoned, while the three-columns to the page make-up of the *Gazette* gave place to twin columns. The chief improvement was the adoption of a very slightly larger type, which was, nevertheless, still of a size which would try severely what is regarded nowadays as good eyesight. The first issue of this publication, which comprised twenty pages, was sold at the price of 1s. This was evidently unremunerative. for the price of the next number was increased by 50%. Indeed, the price fluctuated considerably in those days before it finally settled down at 8d. in 1856, with an annual subscription of 15s. in advance or 18s. credit. An enormous amount of space was devoted in those days to the sometimes exceedingly acrimonious proceedings of Parliamentary Committees which sat to consider gas bills. Indeed, one of these was reported verbatim to the extent of 74 columns of small type.

It was in the year 1856 that the "JOURNAL" became associated with No. 11, Bolt Court. The issue dated March 4 of that year was a notable one by reason of the fact which found expression for the first time in one line of the smallest type at the foot of the last page—"Published by William Boughton King, of No. 11, Bolt Court, Fleet Street, in the City of London." This formed a family association with the business which has extended unbroken to the present day. It was in this year also—when the paper was published on alternate Tuesdays—that we linked up with the subjects of water supply and sanitary improvement, though it must be admitted that these other matters did not receive a great amount of attention in our columns. In spite of this, however, we retained the last-named item in our title till 1913, while four years later we assumed our present name.

Weekly publication began in 1874, and from that day to this there has been no break in the continuity, save for a single issue during the General Strike of 1926, when the task of going to Press presented insurmountable difficulties.

Types and Layouts.

So far as types and layouts go, a gradual improvement began to become apparent towards the end of the nineteenth century. Type faces grew cleaner, slightly larger, and a trifle more legible. In 1890 we abandoned the "Old English" type in our headings and adopted a more general use of black capitals and heavy type faces to give greater prominence to articles. While there was still a reluctance to "let ourselves go" in regard to the more ambitious layout of headings, there was an increasing use of blocks, particularly among the advertisements, though these were of the wood-cut type—complicated engravings or rather crude line-blocks. Nevertheless, some quite effective illustrations were obtained, though it was not at all uncommon to go through several issues of the "JOURNAL" without finding a single illustration of any kind in the editorial pages. And those which did appear were more often than not complicated diagrams relating to new patent specifications.

It is often the advertisers who lead the way in regard to layouts, being specialists in that type of work. We find, therefore, that the first half-tone block (that is, an illustration reproduced directly from a photograph by means of a screen) appeared in an advertisement by Richmond & Co. in September, 1892, depicting that firm's stand at the International Exhibition in Douglas, Isle of Man; and lest anyone should wonder what this strange illustration was, a caption read "Reproduced from a Photograph." It was nearly a year before the editorial pages followed this lead, and the first half-tone illustration we are able to trace in these columns consisted of an enormous affair, filling almost a full page and showing what is described as the "Hydraulic Coke Screening Crane at the Saltley Works, Birmingham." It was still some time, however, before the technique of the half-tone block became sufficiently developed to warrant more extensive adoption in both editorial and advertisement pages.

Improvements of a minor nature in types and layout were noticeable during the ensuing years; but it was really not until the years immediately following the war that trade papers became fully "layout-conscious." Thenceforward we made rapid advance and began to concentrate on "featuring" our articles by means of more attractive types and headings, and jettisoned the old-fashioned idea of trying to squeeze the greatest possible number of words into every page in favour of clarity and what is nowadays called "reader appeal." In the meantime progressive improvements were effected in our front cover design, including the introduction of more colour, in January, 1930; July, 1930; October, 1933; August, 1935; and July of last year.

But time marches on, and types and styles which are one day regarded as the "last word" become almost overnight unfashionable. So the old order changeth, and we present the "GAS JOURNAL" to-day not merely in a shape which we believe to be, both æsthetically and from the utility point of view, a definite advance, but made up on a new and better paper with new and better types.

Most obvious among the changes is, of course, the adoption of a "squarer format," and in taking this step we have broken with a tradition extending back over nearly ninety years. We do so, however, with something like a sigh of relief, for modern demands and artistic considerations are to-day more important than traditions, and it will be generally agreed that our new "format" presents a picture more pleasing to the modern and more critical eye, a paper more convenient to handle, and a space more amenable to the work of the advertising specialist, editorial staff, and layout man. With regard to editorial matter, our type faces, both text and headings, have been replaced with the latest designs. The former is now set in one of the latest faces—*The Times* New Roman.

We have set out the foregoing historical notes with the object of showing what steps we have always taken to move with the times. We end with the assurance that the history of the Gas Industry will continue to be faithfully written in the volumes of the "JOURNAL," as it has been recorded for nearly 90 years.

The Future Orientation OF THE Gas Industry

In a spirit of enquiry the Author of this article, who is a London gas engineer, discusses the relationship between the extra cost of transmitting low-grade gas from the works to the consumer and the saving in manufacturing charges which might be effected by the adoption of low-grade gas made in a simple plant. He assumes a cost into holder of 1d. per therm.

By "M.Inst.Gas E."

Public utility industries place in the forefront of their shop window the value of the services they render to the public. The Gas Industry is no exception to this rule, and rightly so. One of the major problems of the Gas Industry is to sell gas, for unless someone will buy gas the technicians will lose their job of making it. Salesmanship is thus rated high, and never was it in more esteem than to-day. It used to be said that profits were made in the retort-house, but gas engineers have lately been forward in denouncing this ancient maxim and in declaring on the contrary that profits are made in the showroom. The Industry is in danger of becoming a guild of shopkeepers. It is time that we shook ourselves free from the increasing strangle-hold of the shopkeeper mentality. We are a highly technical industry, and gas will be sold on its technical and economic merits by technical men. Technical men have a great work yet to do in their severely technical sphere, and without that work the salesman is powerless.

The salesman mentality is making us believe that what we say in our shop window is to be the guiding principle of our work. Up to a point there may be no harm in this. It is, for example, a gain to be able to say that we never let the consumer down. Whether this is so great a gain as many appear to believe is open to doubt. The electricity industry is renowned among paragraphists in the Press for "black-outs," but the rate of increase of electricity is much greater than the rate of increase in gas consumption. There is, of course, an answer to this in the relative amounts of both that are used, and in the comparative youth of the one industry compared with the other, but at least the fact may be cited to show that the public is not deterred from buying electricity on account of the fact that it lets them down sometimes. The public does not buy gas because it is fashionable or for any reason why luxuries are bought. Gas is not a luxury and, therefore, is sold primarily because in the specific conditions of use it is sufficiently cheap for the public's purse. To produce and distribute gas conforming to this criterion is the task of the technical men of the future and not of the salesmen.

An industry that is truly alive must expand. We must expand and not be content to hold our own. The industrial field has been indicated within recent years as that in which the greatest expansion can take place. The valuable results that have been achieved have been due to the employment of technical men in the industrial research centres. The work, the methods, and the results of those centres are too well known to need recapitulation here. It is the ultimate purpose of this article to point out that, necessary as the semi-technical salesman may be, real advances in gas sales can only be made by advances in the art and science of gas engineering either on the manufacturing or on the utilization sides of the Industry. The experience of the London and Counties' Coke Association has shown that the same thing is true in coke disposal. The technologists on the industrial gas side have shown us what can be achieved when trained chemists, physicists, and engineers attack industrial problems. Let us enquire what might be done if equally alert minds attacked the domestic field.

Extent of the Field.

A rapid calculation indicates the possibilities. A ton of house coal contains as delivered about 300 therms. The quantity usefully employed is 60 therms (efficiency 20%). Since the efficiency of gas utilization is 40%, the quantity of gas exactly equivalent to 1 ton of coal is 150 therms. Since, however, gas can be turned off when not required, greater economies are possible, and calculation and experience together show that about 100 therms of gas are needed to displace 1 ton of coal. The quantity of gas sold to-day is in round figures 1,500 million therms a year, on the foregoing basis equivalent to 15,000,000 tons of coal. Possibly as much as 30% should be deducted from this for industrial gas, gas engines, street lighting, &c., to obtain the domestic heating and cooking consumption, making an equivalent coal figure of just over 10,000,000 tons of coal. If a large proportion—say, 75%—of the coal now used for household purposes could be converted to gas, the Gas Industry could become four times its present size, irrespective of what is done in the industrial gas field.

Is it probable that we can advance any way in this direction? In answering this question it is well to remember that in the last 150 years, which has seen the industrial revolution, the world has changed as much as it changed in the preceding 10,000 years. The possibilities of supplying gas to the exclusion of coal depend partly on the fact that the public is becoming accustomed to doing less work. In the labour conditions of 100 years or so ago we had a working day of at least twelve hours, we had child labour, and we employed women in coal mines. There was very little mechanical assistance to work of any kind. To-day the machine does everything for us, and anyone who makes a list of the household appliances which to-day lighten women's work as compared with those available even thirty years ago, will see how fundamental has been the change. Labour saving is becoming the basis of domestic life. Increasing leisure is becoming a basis of all life; in some industries and some countries the working day is now only half what it was fifty years ago and, with the continued growth of the machine, may soon be even less. There are those who look forward to the time when we shall work no more than four hours a day and when man will need to work for no more than twenty years in his life. The women of the country are being brought up to a labour-less life, and those who supply fuel must meet this demand.

The coming of the motor-car has resulted in people being away from home more. Many homes have become little more than a dormitory, and if this social change continues it is bound to affect the type of fuel that is needed in the house. The fuel of the future will have to be available at all times at the turn of a switch or a tap, must require no clearing away of ashes or other refuse, and must be so clean that it will not cause dirt. As a practical commentary upon this, we are not far from the time when the women of the country will awaken to the fact that nearly all the cleaning that is necessary in their houses can be avoided by two simple measures—(1) smoke abatement, and (2) avoidance of dust clouds from our roads during the dry summer weather. When they are fully awakened to this fact we may be quite sure that smoke abatement will come into its own.

The Place of Solid Fuel.

Those who have followed this argument will see where it is tending. It is, in a word, that the public will demand gas and electricity. It will have little domestic use for coal, and it will have only a modified use for coke. There will always be a proportion of people who will not be affected by the restlessness of the motor-car and who will regard homes as places to live in. Some of these people will like a solid fuel fire, though how many years it will be before the whole population gets used to gas fires is problematic. It is also probable that central heating will increase in popularity in private houses. Coke will be required for central heating boilers. In the towns there will be huge blocks of flats such as are springing up daily, and these will for the most part be centrally heated, the heat being paid for on a yearly basis in the rent. The conclusion that is reached is that the Gas

Industry of the future must visualize the sale of a certain amount of domestic coke which will probably be more than it is to-day, since there is a very great deal of coal yet to be displaced by smokeless fuels.

The great stand-by of the Industry in the future, however, must be gas. It is not too much to suggest that a high proportion of the private houses in the country will be wholly converted into gas-consuming houses. The Gas Light and Coke Company has just shown us what can be done in this direction at Kensal House. It may be that the world will one day reach a Utopia in which all people will have sufficient money born of the added power given them by the machine so that they need not be concerned about the cost of their fuel. That condition, however, does not exist to-day, and gas engineers as technical men must turn aside from the purely sales aspect of this problem to remember that the guiding principle to-day in the majority of houses is cost. It is the function of the gas engineer to supply gas sufficiently cheaply to enable it to be used to replace coal. There will always be some who are prepared and able to pay more for convenient fuels, but for the great majority the weekly cost of heat is an item of fundamental importance. The womenfolk of these households may desire labour-saving appliances, but that desire cannot be gratified unless the cost is at least no greater.

We have calculated that 100 therms of gas will replace 1 ton of coal for domestic purposes as a whole. If, therefore, house coal costs 30s. a ton, gas must be sold at 3·6d. a therm. If coal costs 50s. a ton, gas can be sold for 6d. a therm. It must not be forgotten that if a coal-fired house is changed over to gas there will be additional expenses for hire, or hire-purchase, of appliances, so that the actual price of gas must be a little below these figures. It is the business of the gas engineer to make and distribute gas sufficiently cheaply to permit of the all-gas house becoming a practical possibility, not only in isolated places, but throughout the country. That is a technical problem of the highest moment and demanding the highest degree of skill, which brings us back again to the retort-house.

The writer wishes to make it clear that he is actuated purely by a spirit of enquiry. In the course of the enquiry the writer's investigations have ranged over all types of gas-making processes, over gas distribution, and to some extent over gas utilization. What are believed to be the facts will be recorded here, and so will be the conclusions to be drawn from them. If brother gas engineers have sound reasons to the contrary, it is hoped that they will ventilate them.

Cost of Gas into Holder.

The cost of making gas under reasonably favourable circumstances has been published by Mr. E. G. Stewart (Transactions, Institution of Gas Engineers, 1929-30, p. 660), and Mr. R. W. Hunter (Transactions, Institution of Gas Engineers, 1933). In Mr. Stewart's figures the cost of the coal was 21s. 6d. a ton. In Mr. Hunter's figures it was 20s. 9d. a ton. The net cost of the coal, less residuals, was, however, very similar in the two instances, and for practical purposes the figures may be taken as being on the same basis. The cost per therm of unpurified gas is given by these Authors as follows:

—	Total Manufacturing Cost.
	Pence per Therm of Unpurified Gas.
Continuous verticals—	
Stewart	1·815
Hunter	1·634
Horizontals—	
Stewart	2·099
Hunter	1·947
Intermittent verticals—	
Hunter	1·946
Coke ovens—	
Stewart (estimated)	1·804
Hunter (actual)	1·669

The costs just given, which include capital charges but not purification costs, are those for large modern plants, and do not represent the general run of costs in the Industry as a whole. Published figures in a recent year for 16 gas undertakings of all sizes and selected quite at random in various parts of the country give the following manufacturing costs in pence per therm:

4·25	3·27	3·84	2·52
2·21	2·72	3·64	4·55
3·16	3·84	4·33	2·84
4·97	2·44	3·86	2·57

The average of these figures is 3·43d., and if a similar figure for capital charges to that given in Mr. Hunter's Paper be added to make the basis comparable, the figure is extended to 3·7d. This figure may be a little harsh on undertakings with modernized plant, but it does not seem safe to assume that the Gas Industry as at present constituted can produce purified gas, including capital charges on manufacturing plant, management, and so forth, at a figure less than 2·75d. per therm when purification costs are taken into account. The large well-equipped installations such as were referred to by Mr. Hunter and Mr. Stewart appear to be capable of producing purified gas at 2d. a therm during the period when they are in good condition. Water gas plant would not produce gas of 450 to 500 B.Th.U. per cu.ft. more cheaply than a carbonizing plant.

There seems to be a general disposition to consider that gas-making plants have reached a peak of development so high that very little decrease in the cost of gas-making can be expected, and with the plants of the present design this is probably true. It is open to consider, however, whether there is not some simpler method of making gas, and an examination of the possibilities has led the writer to consider that an internally heated low-temperature retort *plus* a producer gas generator, the two forming a single unit, is the simplest and cheapest of all. There are many ways in which a plant of this character can be designed, but the general principle of a unit seen by the writer is somewhat as follows: The coal is fed into the top of a gas producer and is carbonized by the sensible heat of the rising gases. The coal at the bottom of the producer, which has been converted into coke, is met by a mixture of steam and air as in ordinary gas producer practice. There are thus two distinct zones: (1) At the top of the producer the coal will be giving off low-temperature gas of a high calorific value; (2) at the bottom there will be generated producer gas of a calorific value of about 140 B.Th.U., a revolving grate at the bottom of the producer enabling coke to be discharged at any desired rate. It is possible in this plant to produce gas having a calorific value between 400 and 160 B.Th.U. per cu.ft. according to whether very little or all of the coke is gasified. In practice a C.V. between 200 and 250 B.Th.U. might be used. The writer believes *that in a plant of this type working under reasonable average conditions the cost of making* 200 *B.Th.U. purified gas into holder is of the order of* 1*d. per therm.* He is of opinion, too, that under really favourable conditions costs can be still lower.

200 B.Th.U. Gas.

The gas we decide to produce can be assumed for the purpose of this discussion to have a calorific value of 200 B.Th.U. per cu.ft. This gas can be made in a much simpler plant than is generally in use to-day, and without requiring any additional gasholder capacity on account of the flexibility of the gas-making unit, at a cost, it is believed, of 1d. a therm, as compared with the cost of 2d. to 3d. per therm stated for other types of plant. This is an important saving which would go far to enable the all-gas house to become practical politics.

The writer wishes it to be clearly understood that in putting forward the foregoing example he does not press claims for any particular system of gas making. He desires only to point to the advantages in cost of manufacture which he feels would arise from the adoption of a low C.V. gas standard (say, 200-300 B.Th.U. per cu.ft.). These would arise from the simplification of the plant, resulting in low capital charges, low labour costs, great flexibility—gas production being regulated merely by the speed of the steam-air blower and the rate of coal feed—and small maintenance costs. A practical point of great national importance is that a system of this character can use non-coking or weakly coking coals, thus producing coke of high combustibility and conserving our national supplies of coking coals. Just what form the plant should take is a matter for designers and constructional firms. It is important, however, that the Industry should recognize the

advantages of simplification of plant which can only be secured by distributing gas of low calorific value.

Compression Costs.

An obvious objection will be put up to this proposition at once. We shall be told that since this is gas of only 200 B.Th.U. per cu.ft. it will require 2½ times the volume to do the same amount of work, and the gas will have nearly twice the specific gravity of 500 B.Th.U. gas, so that the distribution costs will be disproportionately heavier and will neutralize the saving in manufacture.

It is worth while making a few simple calculations to examine the basis of this argument. Consider, in the first place, a main that is to transmit 100 therms per hour over a distance of 2 miles. This corresponds to 20,000 cu.ft. per hour of 500 B.Th.U. gas, and of 50,000 cu.ft. of 200 B.Th.U. gas. Calculated from Pole's formula, if the pipe be 12 in. diameter, the pressure drop for the rich gas is 1·3 in. w.g., and for the low-grade gas 13 in. w.g. It is evident that the low-grade gas would require the installation of a compressor, and would thus cost more to transmit than the high-grade gas.

To investigate this a little farther, let it be supposed that the main is only 10 in. in diameter. We have then a pressure drop in the case of the rich gas of over 7 in. w.g. This pressure might be supplied direct from a holder, though, of course, in practice it would not be so; but let us suppose that it is, so that there is no compression cost for the rich gas. The low-grade gas would require compression, and conditions can be calculated from Coxe's formula

$$Q = 33{\cdot}3 \sqrt{\frac{d\,(P_1^2 - P_2^2)}{sL}}.$$

It can be assumed that the terminal pressure P_2 is 0·3 lb. per sq.in. gauge, or 15 lb. per sq.in. absolute. The initial pressure required will then be found to be 15·92 lb. per sq.in. absolute, or 1·22 lb. per sq.in. gauge pressure. This requires at the compressors approximately 0·2 h.p. per hour per 1,000 cu.ft. of gas; and taking a standard figure of 0·36d. per h.p.-hour as the cost of steam, we find the cost for compressing is 0·072d. per 1,000 cu.ft.—*i.e.*, 0·036d. per therm. It is submitted that this is an inconsiderable charge in view of the saving in manufacturing costs.

It will be objected, however, that new mains will be necessary if we supply low-grade gas. There are two replies to this. At the moment we will give one of them only, and will reserve the other for later discussion. The reply that will be given here is that an initial pressure of 1·22 lb. is equivalent to approximately 34 in. of water. If a main which is already carrying 7 in. w.g. cannot carry gas at 34 in. it would appear that the main is in a dangerous condition and should be renewed.

As a third instance, let us consider the case in which the main is so small that both the gases must be transmitted under pressure. For this case let us transmit 100 therms of gas per hour through a 6 in. pipe to a terminal pressure of 0·3 lb. gauge. Again calculating by Coxe's formula we find that the absolute initial pressure for the rich gas is 16·2 lb., and for the poor gas 24·4 lb. This corresponds to 0·25 h.p.-hour per 1,000 cu.ft. for the rich gas, and 1·1 h.p.-hours for the poor gas, which on the same basis of calculation amounts to 0·09d. per 1,000 cu.ft. for the rich gas as against 0·4d. per 1,000 cu.ft. for the poor gas; or to 0·014d. per therm for the rich gas as against 0·2d. for the poor gas. In round figures, therefore, and using the pressure main, we can save from 1d. to 2d. per therm in manufacturing charges by expending an additional 0·2d. per therm in transmission charges.

Finally, let us examine what seems to the writer to be the most important case of all, that in which a completely new pipe is to be installed, so that in each case the size of pipe can be calculated to give the most economical working. Obviously, if any considerable number of all-gas houses are put on to a main, a new main would be needed to carry the gas. The method of calculation is to take several diameters of mains, to calculate from Coxe's formula the initial pressure required to give a terminal pressure of 15 lb. per sq.in. absolute, and thence to calculate the h.p. per 1,000 cu.ft. per hour, and the cost of power. The cost of the main is then determined, for which in the present instance capital charges of 11% have been allowed; thus the cost of the main per 1,000 cu.ft. is given by

$$\frac{C \times 0{\cdot}11}{Q \times 365 \times 24}$$

where C is the capital cost of the main including laying and replacement, and Q is the volume of gas in thousands of cu.ft. passed per hour. By selecting different pipe diameters and calculating the pressure needed to transmit the given quantity of gas through them over the given length, and by calculating the cost of power and the capital cost of the main, we find that for one particular pipe diameter the cost is a minimum. To illustrate the difference in cost of transmitting rich gas and low-grade gas, a number of representative cases have been taken with the object of showing the effect (*a*) over varying distances and (*b*) at varying initial pressures.

CASE 1.—*Short Distance and Low Pressures.*

[500 therms of gas per hour is to be transmitted over 1 mile.]

——	Diameter of Main.	Minimum Cost of Transmission.	
		Pence per 1,000 Cu.Ft.	Pence per Therm.
200 B.Th.U. gas ..	20 in.	0·127	0·063
500 B.Th.U. gas ..	12 in.	0·151	0·030

For short distances and low pressures, therefore, the additional cost of transmission of low-grade gas is only of the order of 0·033d. per therm. The pressure required was 0·8 lb. per sq.in.

CASE 2.—*Moderate Distances and Higher Pressures.*

[500 therms of gas per hour is to be transmitted over 5 miles.]

——	Diameter of Main.	Minimum Cost of Transmission.	
		Pence per 1,000 Cu.Ft.	Pence per Therm.
200 B.Th.U. gas ..	20 in.	0·60	0·30
500 B.Th.U. gas ..	12 in.	0·66	0·13

For moderate distances and somewhat higher pressures the additional cost of transmission of low-grade gas is of the order of 0·17d. per therm. The pressure required was 2·5 lb. per sq.in.

CASE 3.—*Longer Distances and Higher Pressures.*

[To vary the conditions a smaller quantity of gas is selected in this instance, and it is required to transmit 200 therms per hour over a distance of 10 miles.]

——	Diameter of Main.	Minimum Cost of Transmission.	
		Pence per 1,000 Cu.Ft.	Pence per Therm.
200 B.Th.U. gas ..	10 in.	1·42	0·71
500 B.Th.U. gas ..	8 in.	1·80	0·36

For longer distances and higher pressures, therefore, the extra cost in the instance taken was of the order of 0·35d. per therm. The pressure required in this instance was 16-17 lb. per sq.in. gauge.

In these three cases it is shown conclusively that the extra cost of transmitting low-grade gas from the works to the consumer is quite inconsiderable compared with the saving in manufacturing charges which the writer assumes can be secured by the adoption of low-grade gas made in a simple plant. Moreover, the manufacturing plant is so simple that if long distances of transmission were necessary, it would be as simple and cheap to put down smaller subsidiary gas-works as to erect holders. Most of the gas could be sent for short distances at low pressures.

There are just two considerations to be added to complete this survey of the possibilities of cheapening the cost of gas. The first is that it is claimed that experience and practical tests have shown that 90 therms of 200 B.Th.U. gas will do the same work in the cooker, water heater, or gas fire as 100 therms of 500 B.Th.U. gas. On this assumption, the fact that only 90% of the therms would have to be transmitted would not affect the transmission costs greatly, though it would tend to reduce the cost for low-grade gas. A reduction of 10% in the cost to the consumer is of considerable moment, however.

The second claim is that appliances for burning low grade gas are cheaper than those for rich gas, because no aeration of the flame is needed. The cost of admitting primary air needed for rich gas is not negligible. Many consumers do not understand the manipulation of air regulators, and undoubtedly a good deal of inefficiency results from this cause. It would be a step in the right direction to supply gas ready

prepared for combustion to the consumer so that regulation of the appliance would be rendered unnecessary.

It is submitted that the cost of gas to consumers' appliances can be materially cheapened by the adoption of the principles here described. Research is being undertaken by The Institution of Gas Engineers on the characteristics of gas. It is submitted in all seriousness that this research should not be confined to gases above, say, 400 B.Th.U., but should embrace gases well below that range. Use should be made of experience already available within the Industry. The writer is of opinion that an investigation into these lower regions would show gas engineers that there are things in heaven and earth not dreamed of in their philosophy—or by their Doctors of Philosophy.

A New Process of Treating Tar

Increased Viscosity Obtained

A recently published patent specification (B.P. 471,216) relating to the treatment of tar to increase its viscosity and its resistance to flow is of extraordinary interest. The patentee is Mr. H. J. Hodsman, of Leeds University, and he explains that when heated moist tar is treated with lime there are formed lime salts of the tar acids intimately dispersed throughout the tar so that its viscosity may be enormously increased and the lime salts of the tar acids remain permanently in suspension. The rise in viscosity so produced may exceed 100,000 fold.

Mr. Hodsman further explains that in addition the tar is found to be radically altered in another aspect, for it no longer behaves as a perfect fluid. It acquires an appreciable rigidity so that a considerable force must be applied to produce a deformation of the material—a property not possessed by normal coal tars and pitches. The tar has a structural framework which gives it not only increased viscosity due to the presence of insoluble matter, but also plastic or thixotropic properties. The latter are due to the fact that the structure, though real, is easily broken by mechanical disturbance of the material, but is restored again on standing. This thixotropic property enables the cold tar to be stored, transported, and applied to stone and other materials in ways not possible with normal tar.

In one method of carrying the invention into effect quicklime is incorporated with low-temperature tar in the presence of water and heat, the tar being thoroughly and continuously stirred. The lime becomes hydrated and finely dispersed in the water, and tar acids are dissolved in the water and react with the lime to form salts which are substantially insoluble in the water but soluble to some extent in the tar. Satisfactory results have been obtained by employing a temperature of approximately 70° C. The viscosity of the medium prevents the growth of massive crystals and the lime salts separate in the form of a lattice structure dispersed throughout the mass. The tar, it is pointed out, should be heated before being run into the mixing vessel, provision for heating which is unnecessary.

The time of reaction appears to be independent of bulk provided stirring is adequate. After adding lime, no appreciable change is apparent for a period of half-an-hour to an hour. It is believed that during this period reaction takes place forming salts which remain dissolved in the tar. Then a marked rise in viscosity commences, and the character of the material alters radically. After three hours rise in viscosity practically ceases and there is little advantage in more prolonged stirring. The product obtained in this way from tar from continuous vertical retorts has been found to be an excellent binder for road material when treated with from 2% up to 5% of lime.

In the course of tests an alternative method for preparing a road binder was observed. It was shown unnecessary to stir in the reaction vessel until stiffening was complete. It sufficed to stir for as little as 15 minutes after adding the lime, during which no appreciable rise in viscosity occurred. It was found that the mixture, when immediately applied to stone, was not inferior in binding strength to mixtures stirred for three hours. It is suggested that this is due to the crystallization of salt *in situ* on the stone.

Tars differ in susceptibility to the treatment. As little as 1·6% of lime produced the desired effect in a certain tar from the carbonization of West Yorkshire coal in continuous vertical retorts, whereas tar made from similar coal in horizontal retorts did not stiffen appreciably when 10% of lime was added.

Tars of paraffinoid or non-aromatic character—continuous vertical retort tar, low temperature tar, producer tar, and even carburetted water gas tar to which phenols have been added—respond to treatment with lime. However, the desired properties can be imparted to all common types of coal tar, to bitumens, and mineral fuel oils if appropriate adjustment of the tar acid content is first made—either by addition of tar acids or by blending with tars rich in tar acids.

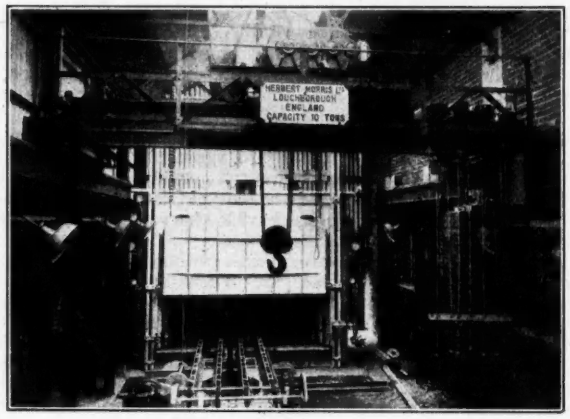
Extending the Industrial Gas Load

A Large Carburizing Furnace

A furnace unusually large for its purpose has recently been installed at the Cheston Road Works, of British Timken, Ltd., manufacturers of tapered roller, ball, and parallel roller bearings, of Aston, Birmingham, 7, by Messrs. Gibbons Bros., Ltd., Dibdale Works, Dudley.

The special function which this furnace is to perform is probably a record in the metallurgical world—*i.e.*, carburizing for 150 hours and giving a depth of case of $\frac{1}{16}$ in. with a minimum core strength of 100 tons per sq.in.—and the high degree of precision demanded in the manufacture of Timken tapered roller bearings makes it imperative that the accuracy and certainty of the temperature shall be maintained the whole time.

The furnace is arranged to fire on the Gibbons-Webb patent roof combustion system, which gives the utmost uniformity of heating across the hearth and is also equipped with automatic temperature control. A number of transverse arches are arranged across the furnace. These arches support perforated tiles through which the air for combustion passes in small jets. The gas is admitted on each side of the furnace immediately under these perforated tiles and forms a blanket of gas, in which the air jets burn. Immediately above the air chamber are a number of longitudinal flues connecting to the cross flue to the chimney. The metallic recuperator tubes, which are specially heat treated, are arranged across these longitudinal flues and the air for combustion passes through these tubes before entering the air distributing cavities. The gases are drawn down to, and around the load in the furnace, and eject into the flues arranged under the



The Gibbons Furnace, showing the Charger in the Foreground.

floor and between the charging machine slots, then into the lower flues and up the back wall of the furnace where each flue is controlled by a regulating damper. From the flues in the back wall the waste gases run into the longitudinal flues previously mentioned and then finally into the chimney.

The working chamber, which is 11 ft. by 11 ft., is 3 ft. 6 in. to the springing line of the doorway, has a maximum capacity of 9 ft. Bearings 66 in. in diameter have already been treated, and it is interesting to note that a bearing with an outside diameter of 52 in. designed for use on the back-up rolls of a Continental steel rolling mill, weighs 3¼ tons when completed.

It requires 4,167 cu.ft. of gas per hour for a period of 24 hours to bring the furnace to a working temperature. The load is then charged and an average hourly gas consumption of 3,040 cu.ft. is sufficient to raise the temperature to that required and to maintain it within 10° C. until the necessary depth of case is obtained. Approximately 4½ tons of work has been dealt with at one heating. Of the five thermo-couples which automatically control and record the heat, one, the control one, is situated at the back of the furnace, while the four recording thermo-couples are placed in pairs on either side.

The Gibbons-Van Marle charger, shown immediately in front of the furnace in our illustration, is an important part of the subsidiary equipment. The charger proper is arranged in two parts and mounted upon a chassis of robust girder construction which can be moved transversely across the furnace.

The oil cooler, made by Messrs. Worthington-Simpson, Ltd., London, cools the oil into which the components are dipped for quenching during treatment. The quenching tank holds 4,000 gallons of soluble quenching oil, which is cooled at the rate of 7,000 gallons per hour to below 35° C.

The Junior's Part in the Gas Industry

An Address to the Scottish Junior Gas Association at a Joint Meeting held at the Royal Technical College, Glasgow, on Saturday, Dec. 11—Mr. R. A. MacLAREN (President of the Western Section) presiding.

by
G. DIXON,
Junior Vice-President of The Institution of Gas Engineers

It is fitting, as an introduction, that I should commence my remarks with a tribute to the memory of those great pioneers who led the Industry in the first 100 years of its existence and whose work laid the foundation upon which the present proud Industry has been built. We in these days, each contributing to the advance and starting from where our immediate predecessors left off, are too apt to express surprise that the old standards were considered good enough without realizing that the young men of to-day, who must become the leaders of the future, will probably themselves then express surprise at the 1937 methods. Indeed, we Juniors—and I hope I may still be regarded as a Junior—are fortunate to be engaged in an Industry which has been reborn with the experience of 120 years behind it, and which has a boundless future as an encouragement for the years to come; for who is there among us who fails to realize that we have but touched the fringe of the possibility of scientific use of our national coal resources?

The Present Position of Our Industry.

The recent records of our Industry show that continued and steady progress is maintained in spite of all competition. Indeed, I am not sure that "in spite of" is the proper phrase. Probably it would be nearer the truth to say "because of" all competition, for should we have made the same advance in the technique of coal carbonization had it not been for the incentive born of economic necessity partly as the result of competition?

Sir Philip Dawson in his Presidential Address to the Institute of Fuel in October of this year said: "As a result of the progressive spirit prevailing in the Gas Industry, statistics show a steady growth of gas consumption. Notwithstanding improvements in the efficiency of gas appliances and competition from other fuels, the output of gas is still increasing. It has risen in the last ten years by approximately 10% and amounts at present to over 300,000 million cu.ft. per annum, or over 1,400 million therms, and is thus more than twice as much as the heat equivalent of electrical energy generated in this country."

Especially interesting are the words "As a result of the progressive spirit prevailing." Here lies the strength of our Industry—the pooling of knowledge by the greatest and the smallest and by making the results of experience available to all. It is as a result of this loyal co-operation and research that we make our claim that the overall thermal efficiency of manufacture is over 80%.

The Gas Industry is to-day one of the outstanding examples of an industry which within a comparatively short time has developed from an almost rule-of-thumb process to a highly technical one. The demands of its engineers for increasing efficiency and lower production costs together with those of its consumers for greater flexibility in use, higher standards of purity, and more reliability in service have created conditions necessitating almost complete revision of manufacturing, distribution, and sales practices in the light of modern scientific investigations. This rapid technical progression will continue as is indicated by the ever-increasing number of problems engaging the attention of all sections of our research bodies. Evidence of this is, of course, to be found in the fact that so many Reports have to be presented to our Institution that it has become necessary to call a Research Meeting in the Autumn of each year in addition to the usual June Meetings.

When the results of research are applied in the works on a practical basis it falls to the lot of the juniors to operate the new plant or process, and it is interesting therefore to note the Research Reports presented at the Autumn Meeting last November.

The present high figure of thermal efficiency of carbonization suggests that further progress on the manufacturing side must be rather in the direction of a fundamental change in the method of treating our coals. The Report upon the "Investigation of the Use of Oxygen and High Pressures in Gasification" deals with such a change. The investigation is, however, so far only at the experimental stage in the hands of the research chemists, and does not yet call for the practical attention of juniors except as a study.

The cry of "Sulphur must go" has become almost insistent, and the Report on practical operation of sulphur removal plants has once again focused attention upon our Industry's indebtedness to the Gas Light and Coke Company. The general adoption of either the active carbon or oil washing or the catalytic process will cause yet another chemical operation to be taken charge of in gas-works practice, and the effect on the distribution engineer and sales organization will be eagerly awaited.

Both manufacturing and distribution sides will welcome the Report of the Joint Research Committee upon the "Combustion Characteristics of Town Gas" as being of prime importance. Who is there among us that has not met with problems arising from the different gravities or constituents of gas from the highly efficient modern gas plants of all types?

We in Nottingham have recently had cause to investigate a difference in the composition of the hydrocarbon content of our gas apparently caused by a very slight difference in combustion flue temperatures. The difference in the gas—not noticeable in the ordinary specific gravity or total gas analyses tests, proved sufficient to "soot-up" every gas burner on the portion of our district supplied with the gas from that plant. Such cases are no doubt known to all the men operating carbonizing plants, but I mention it here so that I can raise the question as to whether plant design and appliance design have not reached a stage where the margin of safety is too fine. In any case, it is, of course, not disputed that plant operation to-day is so skilled that much greater technical staff is necessary and the junior must be competent to fill such conditions.

It would appear that works of a size which cannot justify highly technical staff must be linked up for technical advice with neighbouring undertakings, for gas service given must be made to be of uniform excellence throughout the land if we are to meet competition satisfactorily.

We welcome the continued research on refractory materials. The cost of retort repairs and the small margin of safety between practical requirements and refractory breakdown demand a "cat and mouse" watching by plant operators. Juniors are in a position to help in this work by noting and reporting the details of their practical experience in this connection.

And so the cry goes up from all the leaders of our Industry for more and more research, and who can deny the necessity for co-ordinated research by *all fuel interests?* Indeed it is the old cry of the more we have the more appears to be required, for every advance brings new and unseen problems. Higher carbonizing heats, steaming of charges, producer operation, benzole extraction, gas drying, &c.—each has been attended by difficulties not apparent until put into practical operation.

Future of the Industry.

There is little doubt that in calling for this extensive research we are placing the future of the Industry to a large

extent in the hands of the research chemist. The indications are, however, that we need not fear this position if we judge by the work which has recently been carried out and which is still in progress, to which I have made brief reference.

Much of the present research is moving in a direction the results of which may create revolutionary ideas and promote the adoption of drastic changes in the technique of gas manufacture. The engineer's attitude towards any such methods must, however, be governed by the economics involved, the consumer being his first consideration. When the gap between any process, however revolutionary, and its economics can be bridged, the Industry will be forced to consider very seriously the adoption of such processes produced by the research it has fostered, particularly if by doing so leads to conservation of our coal supplies.

The production of gaseous hydrocarbons with high thermal yields will itself promote further extensive research, and consideration of such problems as the relative effects of the adoption of such a process on the by-product side of the Industry, the production of tar, benzole, and sulphate of ammonia and the effect on the coke market are points directly concerned with any changes in the process of gas manufacture. A considerable change in the composition of the gas made may demand the re-designing of all gas appliances, burners, furnaces, &c., and possibly some alterations to the present system of distribution. It is not my intention to lay stress on any line of development which the Industry may follow, or to anticipate the results of any investigations now taking place. Speaking to you as Juniors, however, I suggest that these may be among the problems which many of you may in the future have to decide in co-operation with the men engaged in research.

What then is the position of the Junior to-day? Obviously he must be prepared to assume greater responsibilities for the benefit of both himself and the Industry. He is facing greater demands upon his ability and more intensive and more prolonged training than juniors of the past. His knowledge of each department or section through which he passes must be far deeper and thorough than has previously been considered necessary.

It is a fairly common attitude for many Juniors to regard the passing of the Gas Engineering Examinations as the "hall-mark" of a gas engineer. Many regard the attainment of a recognized standard of education in the Industry as a claim to rapid promotion, and are inclined to forget that it is necessary to qualify equally well in the application of the knowledge obtained through studentship. They fail to appreciate that success in examinations does not make a man a gas engineer, but only assists him to become one. Education commences when a man enters the Industry and finishes when he dies.

It is by the closest contact with the practical side of his training that the Junior can develop the greatest assets necessary for his future success and for fitting him with the capacity to assume greater responsibilities. Particularly does this apply to his powers of observation and detection, and coupled with these an ability to concentrate. It is not all Juniors who observe or realize all the problems concerned in the duties allocated to them. To occupy his attention to things that are progressing normally and without trouble is of little value to him as a training. The most successful Junior visit I ever took part in was when the party was taken round the works and attention drawn to everything that was wrong or could be bettered in the light of chemical or mechanical standards of that day. Everything working normally was hurriedly passed as being of no particular interest. Much was learned on that visit.

To indicate what is meant by the foregoing, allow me to select a few examples. Consider the retort house as a section probably under the control of one or more Juniors. Consider, too, the progress in the methods of coal carbonization from the earlier practice of horizontal and inclined retorts. We have adopted the vertical retorts with their varied designs and sizes, and we find that each step we have taken in securing improved thermal output per ton of coal has increased the technical skill required to maintain the improved efficiency.

The adoption of breeze burning in producers and the resultant dust problems it has created; the installation of waste heat boilers with their supervision and maintenance; the more technical provisions made for the control of gas pressures both inside the retorts and on the combustion flues; the blending of coals to give satisfactory carbonizing conditions and to produce the required coke—these are a few of the problems which have been thrust upon the man or men in charge of the retort house.

It is not sufficient to be aware only of the composition of the producer gas and waste gases on the retort bench, but how and to what extent conditions can be improved. How far is the waste-heat boiler from being overloaded by incorrect conditions and what economy can be effected by the possible improvement? If your waste-heat boiler is fitted with an augmenting producer gas supply, to what extent is it economical to use this provision on your particular job?

These are typical questions which the Junior should ask himself and provide the answers before he can consider himself conversant with his job in the retort house. The desire to know these things and to investigate them should be prompted by his own initiative when he has reached the stage of observing that such problems exist, and not by the promptings of a senior man. It is often the failure to observe these points that allows conditions to develop which may result in loss of efficiency or output from the plants.

These comments are not intended to suggest that a Junior employed in one particular section should devote the whole of his attention or interest in that section to the exclusion of an interest in the works in general. Such a condition, however, may be difficult to avoid in the larger works where a number of Juniors are employed and where it is not possible for each man to be a "free lance." The average gas-works is not, however, so extensive that it prevents the Junior from keeping in touch with its general operation. I think it may be said of the average gas-works that such a variety of plant is necessary for its operation that it offers far greater "all-round" experience to the Juniors than the majority of industries. In most works it is possible for the Juniors to become familiar with the entire plant and to accustom themselves to its usage and control.

Technical Skill and Efficiency.

There is a tendency, however, for Juniors to consider the operation of plants as the duty of the particular operatives concerned and be concerned only with the function of the plant. There are many instances where the efficiency of a plant is allowed to fall which could be rectified or prevented by the technical skill possessed by the average Junior, if thoughtfully applied. Coke screening plants may be considered as an example of this. A few observations made on the operation of a screening plant may give rise to such questions as:

(1) Is the plant designed for efficient screening and can its efficiency be improved?
(2) Is the plant being overloaded, or subjected to irregular loading which may be prevented?
(3) Is the coke too wet for efficient screening or so dry as to cause mechanical troubles arising from excessive dust?
(4) Can "bagging" or loading facilities be improved?

These are points which do not require highly technical skill, but often cry out for attention.

Water, steam, and electricity consumptions on various plants give very useful data which it is often possible to obtain by very simple means. Such data may provide many opportunities for improving the economics of the plants concerned and provide the Junior with information which will prove a valuable asset in his training.

Will you allow me as an older Junior to summarize some of the points where the young man often fails:

(*a*) Appreciate the practical experience of workmen.
(*b*) Study the methods of your men.
(*c*) Take an interest in their welfare.
(*d*) Learn to set out results of your tests intelligently.
(*e*) Learn the value of graphic representation of results.
(*f*) Learn the value of debating classes.
(*g*) Try *something*—no chief will blame a genuine mistake.
(*h*) Learn the value of your competitors.

I am not quite sure how far you may think I am straying if I refer to the question of works superintendence, store-

keeping, and the office side of your work, but I am tempted to ask you to give some study to these matters, first, because I find many Juniors fail to make the progress they deserve because they have not given due attention, and secondly, because I believe you cannot get a true picture of or a full interest in your practical work without a study of these matters to see how your particular work contributes to the result. And I advise attention to the orderliness of works. How often have you seen gas-works littered up for lack of organization or the carrying of obsolete or surplus stocks and stores? I commend to your attention the wording of a works notice which I have seen and which reads: "This is a Stores, not a Museum."

Plant operating recording charts, progress charts, costing charts, stores charts, and records and the like are invaluable and create interest in your work—but a word of warning; they are worse than useless unless properly designed, properly maintained, properly diagnosed, and properly followed up.

Education.

I think that it will be an encouraging acknowledgment of the importance of the welfare of the Junior that the Report of the Gas Education Committee is included as a Research Subject.

There may be those among you who are not favourable to the somewhat complicated conditions laid down or to the continual modifications determined from time to time, but the Education Committee of The Institution of Gas Engineers are to be congratulated in not resting content after all the labour they have put in, but are prepared to re-design the scheme where such re-design will assist those coming into the Industry to be better fitted for their positions or where it will enhance the status of membership of the Institution. The recent new changes constitute a recognition of the fact that the distribution engineer carries as high a qualification as his opposite member on the manufacturing side. The standard of the Higher Grade Examination on the supply side has been raised to that hitherto required on the manufacturing side, so that the new Certificate in Gas Engineering (Supply) will rank equally with Gas Engineering (Manufacture) as one of the qualifications for admission to Corporate Membership of the Institution.

It may be that the present regulations are somewhat complicated and confusing to the young men—especially to those who cannot qualify as internal students. I would be glad to see the Education Committee, probably through the District Committees, act as a clearing house for all present and prospective students, giving each a set programme of studies and examinations and following their progress through to their final qualifications. I have had a number of cases where young men have asked my advice after they have spent much time taking classes which do not come within the requirements of the Gas Education Scheme. This is valuable time wasted, and it could be avoided if every student could be enrolled by his undertaking and his progress (from the educational standard) watched by the Education Committee. I believe, too, that such a procedure would tend to some standardization in studies which would then lead to a simplification of the present regulations.

I am probably preaching to the converted, but I would urge all Juniors to support their Junior Association and take part in meetings and discussions. It is not always realized that the Junior who makes himself outstanding by his activity in his Association is the man who attracts the attention of a chief with a good appointment to make. Let your Association be a clearing house for practical problems; it will help others confronted with similar investigations and avoid unnecessary overlapping of work.

Finally, I appeal to Seniors to see that Juniors get the recognition they deserve. I look to them to accept some measure of responsibility for the proper training of and opportunity to their junior and technical staffs. It is a duty of masters to map out classes and practical work so that their staffs are not landed into a blind alley occupation. Too much depends to-day upon a youth's luck in the choice of his employer.

I make no apology for making these notes so general and non-technical. The only object I have in view is to make them controversial, as I appreciate the frankness of you men in this Country, and an occasion like this affords an opportunity of getting to know what the Juniors expect or would like from those who hold the senior positions in this great Industry of ours.

Discussion.

At the close of the Address, Mr. R. A. MacLaren (President of the Western District) extended a hearty welcome to Mr. Dixon. He said that it was an honour to have the Junior Vice-President of The Institution of Gas Engineers address them. He then called upon Mr. Rea, President of the Eastern District, to open the discussion.

Mr. Rea said he wondered to whom the credit was due for inviting the Junior Vice-President to address the Joint Meeting each year, as it certainly was an excellent idea. Regarding the Education Scheme, he felt that Scotland had been treated as a part of England, while the conditions appertaining in the respective countries were totally different. In Scotland the number of students was such that difficulty was experienced in carrying on the classes year by year, and students were being penalized by being required to wait until there were sufficient numbers to form a class on a special subject. This meant that the students could not complete the course in 5 years, and had to wait 7 or 8 years before qualifying. Again, the expenses of travelling to London acted as a bar, and he wondered if something could be done to save the student this financial embarrassment.

Mr. Sturrock (Vice-President of the Western District) thanked Mr. Dixon for giving them such a fine Address.

Mr. Webster (Port Glasgow) said that, regarding the Education Scheme, this ensured that the student received the proper technical education, but it was his experience that the man with qualifications did not always get a fair chance when a vacancy occurred.

Mr. E. Smith (Dumbarton), referring to the examination regulations, thought they were too complicated. Regarding students and classes, they had an able Committee to look after affairs, and students should make more use of the facilities offered. He thought, however, that more should be made of the student membership of the Institution.

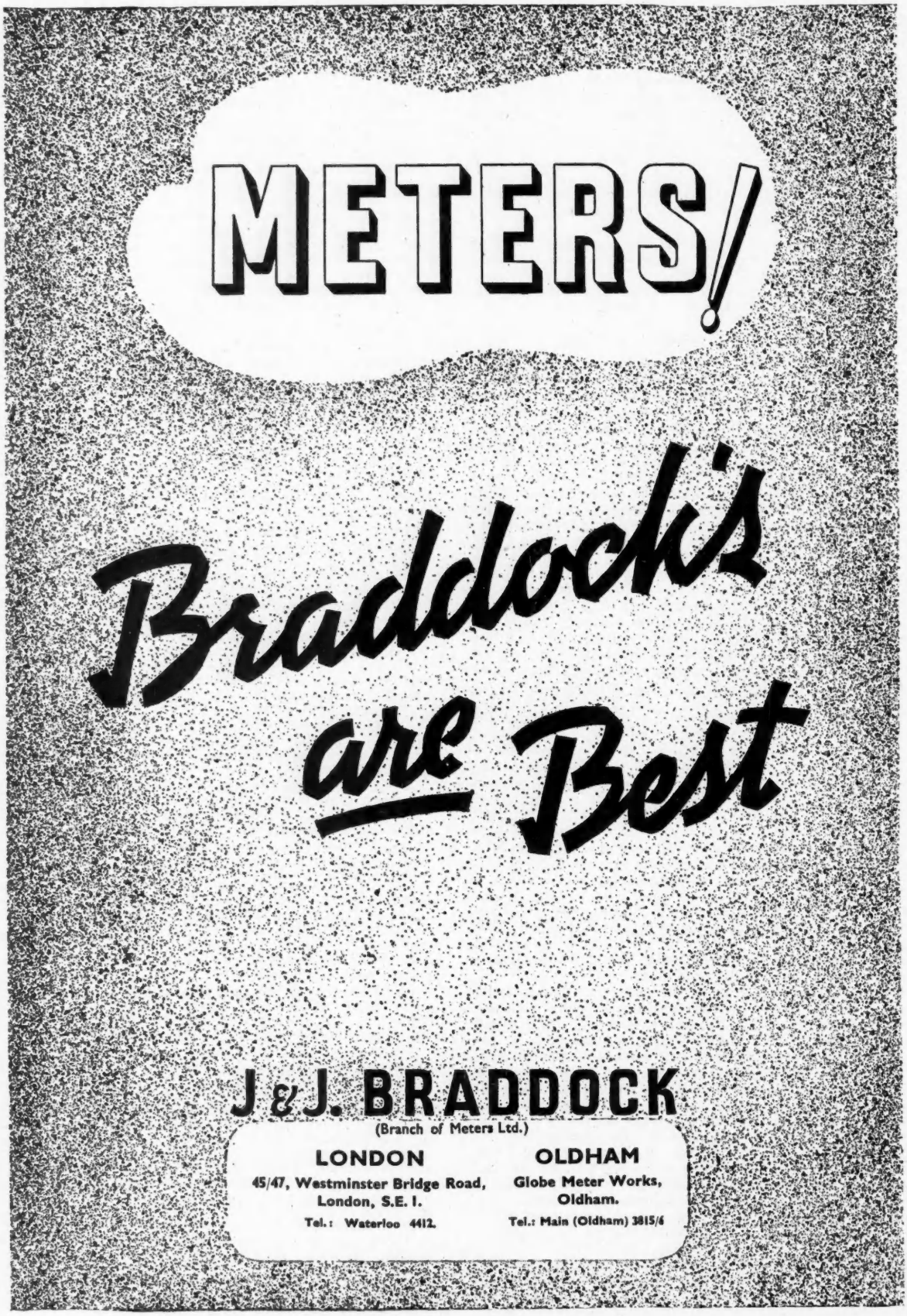
Mr. Blackhall (Edinburgh) suggested that specialization which was rapidly entering the Industry did not give a man in a large works much chance of experience in other departments. In this connection the man in the small works had every advantage, and he did not see why the opportunity could not be given for a change round in order that experience in the works and on the district might be obtained.

Mr. Cowie (Hawick), referring to education said it was most difficult for external students to get the proper courses at local schools, and his experience was that this was more easily obtained in England.

Mr. J. Hall (Glasgow) said that as a member of the Scottish Education Committee and lecturer in Gas Engineering he came into intimate contact with the students and appreciated the difficulties which they were up against. Students who were aiming at the Diploma should ensure that their preliminary qualifications were in order before proceeding with the Technical Course, and thus save themselves much heartburning. The Education Committee was there to help and advise them and he himself was always available during the winter session in the College and would be pleased to answer any question or to take the matter to the Education Committee when they applied for such guidance and help. He wished that students would make their enquiries before their classes commenced and not 2 or 3 months after they had commenced their studies.

Mr. Alexander (Edinburgh) raised the point of students having to cram their technical education at night. Could it not be worked so that the student received some theoretical knowledge during the course of his normal working day?

Mr. Dixon in reply, referred to the proposed change of name for Junior Associations and he thought that there was no loss of dignity in being called a Junior; he was proud of the fact that he was once President of the Manchester and District Junior Gas Association. Referring to the remarks made on the Education Scheme, he assured the members that if they sent in constructive criticism to the Institution it would be seriously considered. Replying to the point on training, he said that the candidate should possess the theoretical knowledge necessary to pass The Institution of Gas Engineers' Examinations and should also be capable of undertaking the practical work, and that the remuneration should be paid accordingly. He agreed with Mr. Smith that the Regulations were complicated, but it was difficult to frame a set of regulations to cover the existing conditions reigning throughout the country. If, however, the students enrolled they would be assured of the best advice governing their circumstances. In his concluding remarks, Mr. Dixon said that it had been a pleasure for him to address the Joint Associations and that he wished them every success.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TRADE NOTES

A Gas-Heated Hot Cupboard and Carving Table.

A new all-purpose service unit combining hot cupboard and carving table has lately been introduced by Sumerling & Co., Ltd. Designed to serve efficiently and economically all hot courses from soup to sweet, the unit is operated by a single burner, thermostatically controlled to prevent overheating, while an automatic water feed safeguards the generator. The unit, which is finished in stainless steel, is constructed in such a way that varying requirements can be met as regards capacity for different dishes, &c. The unit is known as the "Table d'Hôte," and was exhibited at the recent Hotel, Restaurant, and Catering Exhibition at Olympia.

Modern Domestic and Commercial Lighting.

An interesting Paper under this title was read recently at a meeting of the Kent Area Salesmen's Circle by Mr. A. P. Kelsey, of Falk, Stadelmann, & Co., Ltd. Having dealt with the subject in general terms and shown conclusively that the lighting load is well worth fighting for, the author went on to describe the latest types of domestic and commercial fittings manufactured by Falk, Stadelmann, & Co., Ltd. These included the well-known "Saturnlite" and "Spherelite" units, together with the more imposing "Clerkenwell" and "Hatton" fittings. He stressed the value of floor standards, with convenient plug-in attachments, as a means of retaining gas lighting even where electrical pendants have already been installed, and among such fittings he mentioned the graceful "Camelia" unit.

Tully Complete Gasification Plant.

In a modern Tully plant there is incorporated the experience of many years, and improvements in both design and construction have established the plant as most reliable and efficient. Details of some recent installations with an historical retrospect are included in a booklet published by Messrs. Tully, Sons, & Co., Ltd., Millgate, Newark, Notts., in which it is pointed out that Tully plant is designed for the complete gasification of coal, producing a gas which is suitable for admixture with coal gas or for distribution alone without enrichment. Our readers are doubtless familiar with the principle of operation; the plant consists of a water gas generator extended upwardly to form a superimposed vertical retort. Coal charged into this retort is carbonized to coke, which descends by gravity to the generator proper, where it is gasified to water gas. The plant operates on the normal water gas cycle of "blow" and "run." During the "blow," the waste gases are utilized to heat the superimposed retort externally, and during the "run" the hot water gas passes up through the coal charge in the retort and thereby materially assists carbonization.

There are no by-products from the process other than tar. A typical gas has a calorific value of 350 B.Th.U. per cu.ft., and the booklet states that it is entirely suitable for distribution. This is evident from the number of works sending out Tully gas. The plants can be fitted with automatic operators and can incorporate waste-heat recovery. Where a calorific value higher than 350 B.Th.U. is required the plant is fitted with the Tully patent oil carburettor and superheater, which enables gas oil to be used to carburet to 500 or 550 B.Th.U. This plant is suitable as a standby in the event of a bulk supply failure.

Gas Heating for New Canvey Island Hotel.

The Hotel Monico—one of Canvey Island's largest and most up-to-date hotels—has been equipped with a complete gas central heating and hot water supply installation. The hotel is owned by Mr. A. H. Beaumont, who is well-known in the Industry in connection with cleaning and painting processes.

The central heating is carried out by a low-pressure hot water system, consisting of 25 radiators with a net direct surface of approximately 1,000 sq.ft., served by a Potterton No. 1 Series "Rex" boiler of six sections. The system provides for the full warming of the ground floor and certain parts of the first floor—viz., the corridors and Manager's office.

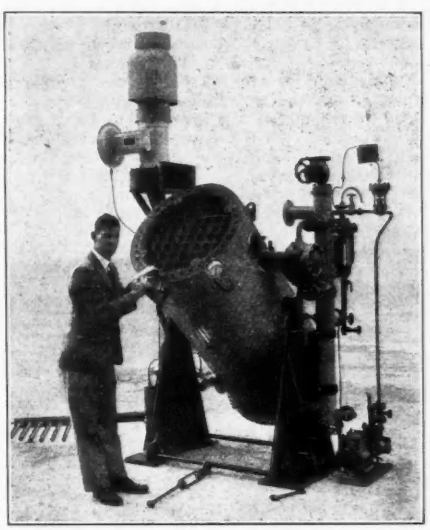
The boiler is installed in a sunken heating chamber, enabling the adoption of the up-feed principle in which two main sections occur, thus serving the respective radiators at a uniform circulating temperature. By reason of the extensive runs to be covered by the mains and the wide distribution of the heating units, accelerated circulation is provided by a silent pump, which maintains equal distribution of the heat throughout the system. Should the electricity fail, however, the circulation will still continue, though at a lower velocity, the pipe sizes being calculated to give this effect.

Hot water throughout the hotel is also provided by gas—there being hand basins in every bedroom, as well as the supplies to the bathrooms, lavatories, culinary sinks, and bar wells. The boiler for this purpose consists of a Potterton "Rex" D. Series 4-section unit, with a storage of 300 gallons capacity in twin cylinders of 150 gallons each, so arranged with cut-outs that one or both can be used according to the demand. From the storage the secondary circulation is provided within close proximity to all points, which total forty-four. The primary circuit, storage, and sectional circulation are efficiently lagged with asbestos composition with an inter-layer of magnesia, and the same applies to all heating mains in trenches that are not required for radiation purposes. A 2½-in. cold feed has been installed for the hot water supply section to maintain discharge at a number of taps simultaneously, and this, being exposed, is lagged with cold sectional covering wired and waterproofed.

Gas is also largely used for other purposes throughout the hotel. Every bedroom will have points for gas fires, while gas has been installed, not only for auxiliary lighting, but for permanent lighting in bedrooms during the winter to promote additional heating. The kitchens will have a complete gas service, including cooking ranges, boilers, refrigerators, &c. Already the owner of the adjoining Casino, this latest enterprise, which provides a fine example of modern gas service, will make Mr. Beaumont the largest gas consumer on Canvey Island. The Hotel Monico is to be opened next Easter.

The "Accessible" Gas-fired Boiler.

An interesting illustrated leaflet issued by Messrs. Cochran & Co. (Annan), Ltd., describes the firm's "Accessible" gas-fired boiler, the latest development applied to their range of town gas boilers. The principal mountings and controls are fitted not on the boiler but on a stand pipe connected to the boiler by two flanged branches, one in the steam space and one in the water space. The chimney, with its automatic damper, is fitted at the side of the boiler and supported independently of it. The gas burner frame is in the front of the boiler, and is on a swivel so that it can be withdrawn easily. With this design, the whole process of cleaning can be completed in a working day.



Cochran's "Accessible" Gas-Fired Boiler.

Triple Success for Radiation

For the recent Cake-Baking Competition organized by the Alliance and Dublin Consumers' Gas Company, there was an entry of 711 cakes, an increase of 100 on those received last year. All first three prize-winners used Radiation gas cookers—a triple success and a tribute to this well-known Company's appliances.

The successful competitors received prizes as follows: 1st prize, an all-enamelled gas cooker; 2nd prize, an enamelled gas washing machine; and 3rd prize, an "Ascot" boiling water heater. Six consolation prizes of enamelled gas irons were awarded.

The Gas Company arranged a series of Demonstrations in their Showrooms a few weeks prior to the date for receiving entries for this competition, and at each of these Demonstrations the actual competition cake mixture was made and baked before the audience, and the items explained by the Demonstrator. The large number of entries proved that the audience attending these previous Demonstrations took full advantage of what they saw and heard.

Cannon Iron Foundries, Ltd.

Annual General Meeting

The Third Annual General Meeting of Cannon Iron Foundries, Ltd., was held on Dec. 30 at Deepfields, Bilston. Mr. R. TALBOT CLAYTON, the Managing Director, presided.

The Chairman, having referred to the unavoidable absence of Mr. G. A. Leitch, B.Sc., the Chairman of the Company, through ill health, said:

The balance-sheet shows that net additions to land and buildings and to plant, machinery, &c., have cost £12,474 during the year. This expenditure was considered necessary to enable the works to meet the demand for larger output, and to speed up deliveries. Unfortunately, we have been prevented from obtaining full productive benefit from these improvements until quite recently. This was due to the steel shortage, which delayed by several months the completion of orders for equipment which we placed more than twelve months ago. I am glad to say that the outlay has proved fully justified during recent months by a substantial increase in output from the departments concerned. The sum of £5,950 has been provided this year to meet depreciation of buildings and plant, &c., and such provision is considered to be adequate.

Cash at bank has been utilized to finance the additions to fixed assets as mentioned above—and is further affected by an increase in stock in trade (£21,787). The increase in the stock figure is mainly attributable to heavier raw material stocks and increased work in progress against firm orders on hand for immediate delivery. The investments in Conversion and War Stock unfortunately show a decline in value of approximately £1,838, and it has been deemed prudent to provide a reserve to meet this contingent loss.

The liabilities were higher than last year by approximately £16,000, but this includes an increase of £10,000 in the taxation reserve. The floating assets are sufficient to cover the liabilities several times over, and the liquid position is very strong.

The profit on trading (£62,148) is £14,800 less than that for 1936, notwithstanding the fact that the turnover again exceeded that of the previous year and constituted a record for the Company. During the year the prices of some of our principal raw materials, notably pig iron and fuel, have risen to very high levels, and increases in wage rates have cost the Company some thousands of pounds. We have, of course, been obliged to increase selling prices to some extent, but it has been our policy to keep such increases as low as we reasonably could, with a view to retaining the valuable goodwill of our customers. Rising costs, which could not possibly have been foreseen, have also adversely affected the profit margin on certain substantial contracts which we entered into with important customers early in the year.

We are naturally taking all possible steps to combat rising costs, to effect economies in production through improved methods of working, and to enlarge our output. We have a satisfactory volume of orders on hand, at prices which we believe will show a reasonable return on present day costs.

Although the net profit this year has not reached the high level previously attained, your Board considers it is quite good in view of the abnormal trading conditions which have prevailed during the year. I am pleased to report that the sales for the first quarter of the current year compare very favourably with those of the same period last year, while, as previously stated, orders on the books are of substantial amount and will ensure a satisfactory turnover during the first half of 1938.

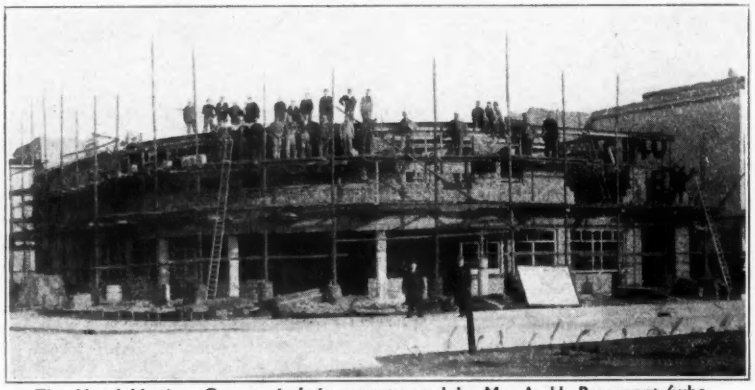
The sum of £1,500 has been provided for distribution by way of bonus to staff, and I desire on behalf of the Board and the shareholders to express our appreciation and thanks to our workpeople and staff for the splendid co-operation and capable assistance throughout the year. You will note that we have commenced a fund to provide our workpeople with an annual holiday with pay. This scheme came into operation in August last, so that the cost in the year under review was only £224; but in a full year the cost will rise to approximately £2,000.

Our liability in respect of the new National Defence Contribution has been fully provided for in the accounts, but it should be remembered that this only commenced to operate in April last, and the amount to be provided next year may be considerably greater.

The report and accounts were unanimously adopted.

"REX" BOILERS

for Central Heating and Hot Water Supply at the Hotel Monico, Canvey Island



The Hotel Monico, Canvey, is being constructed by Mr. A. H. Beaumont (who is well known to the Gas Industry) following the building of "The Casino" which has had a most successful career under his ownership and control since 1934.

For warming the Hotel a No. 1 Series "Rex" Boiler of 6 sections has been installed which heats 25 Radiators containing 1,000 sq. ft. nett direct surface.

For Hot Water Supply, a "Rex" 'D' Series 4-Section Gas Water Heater is installed, with a storage of 300 galls. capacity in twin cylinders of 150 galls. each, so arranged with cut-out that one or both can be used according to demand. This supplies hot water to hand basins in each bedroom, bathrooms, public lavatories, culinary sinks and bar wells.

See our Exhibit at the "News Chronicle" Schools Exhibition—Stand No. 7, Dorland Hall, Lower Regent Street, S.W.1.

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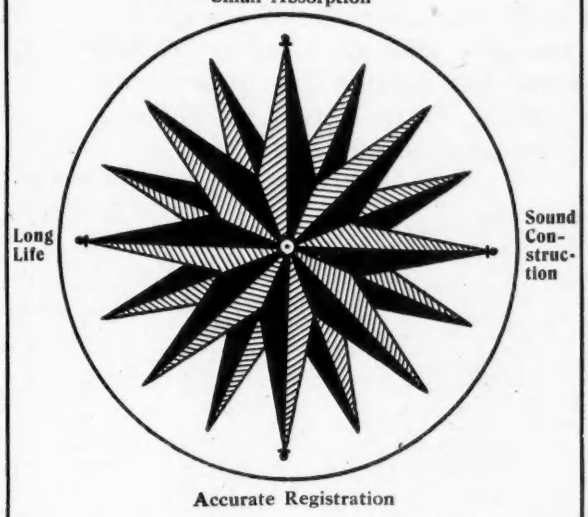

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MANCHESTER.
Phone: 2289 Collyhurst.

New Books

The Analytical Control of Benzole Plants*

This small volume is intended to provide those in charge of benzole recovery at either coke ovens or gas-works with the information required for the proper analytical control of the operation. In these days of specialization, a manual devoted to the technique of a single process performs a useful function. Moreover, a book covering the whole field of by-product or gas-works chemistry may not always be available since it may be in frequent demand by one or other of the members of the staff of a laboratory.

The present manual deals with the determination of benzole in crude and debenzolized gas, sampling, the examination of wash oil, crude benzole, and refined benzole, the determination of the potential benzole yield of a coal by means of a carbonization assay test, and the formulation and verification of guarantees relative to benzole plants. A final section amounting to rather more than one third of the book provides a series of useful tables of data dealing with the chemical and physical properties of the benzole hydrocarbons, and of wash oil, the German specifications for benzole products, the partial pressure of benzole in wash oil and wash oil specifications. Tables covering hydrometer scales and the properties of steam, saturated air, sulphuric acid and caustic soda solutions are also included.

The analytical methods described are, in many instances, standard ones, including those of the Verkaufsvereinigung für Teererzeugnisse, the Benzol-Verband and the British Standardization of Tar Products Tests Committee. In some cases, however, the methods given are somewhat out-of-date. From the fact that the section devoted to refined benzole refers to tests for specific gravity, distillation range, neutrality, content of unsaturated and gum forming hydrocarbons, corrosive and total sulphur, sulphuretted hydrogen, carbon disulphide, mercaptans and thiophen, water, naphthalene, paraffins, naphthenes, aromatic hydrocarbons and non-nitratable constituents and describes also the determination of alcohol and of lead tetraethyl in motor fuels and the evaluation of knock rating, it will be evident that no complaint can be made that any essential test has been forgotten. In some cases alternative methods are given, but in others the descriptions are somewhat brief or are even limited to a reference to a publication in which the details are to be found. There is thus scope for improvements in a subsequent edition. It may also be pointed out that the Author has experienced some difficulty in correctly rendering the titles of foreign journals.

In connection with the well-known difficulty attaching to the accurate estimation of so simple a compound as naphthalene in benzole or in naphtha, it is to be noted that the Author describes the method of Zwieg and Kossendey (Brennstoff- Chemie, 1935, **16**, 154) and not that of the Benzol-Verband.

* Analytische Methoden und Tabellen für die Uberwachung und den Betrieb der Benzolfabrik von Kokereien und Gaswerken, by A. Jenkner. Volume 36 of the Series Kohle-Koks-Teer. [Halle (Saale), 1937. Wilhelm Knapp. Pp. viii. + 96. Price RM. 8.50 bound, RM. 7.30 unbound.]

Gas Undertakings' Results

The Colonial Gas Association, Ltd.

The report of the Directors of the Colonial Gas Association for the year ended June 30, 1937, states that after the payment of debenture and other interest, and making provision for income-taxes and depreciation, the net profit for the year is £71,086. Adding to this the balance from last year—*i.e.*, £25,338, the profits available are £96,423. Having paid interim dividends in April last, amounting to £34,029, there is a balance at credit of the net revenue account of £62,394. The Directors recommended the following dividends: (i) At the rate of 8% per annum on the preference shares (less interim dividend of 4% paid in April, 1937); and (ii) At the rate of 6% per annum on the ordinary shares (less interim dividend of 3% paid in April, 1937); and that £3,000 be transferred to the credit of the reserve fund; and that the balance (approximately £25,364) be carried forward to the next account.

The net revenue account has been charged with the "exchange" cost of £3,672, incurred in paying off an overdraft in London. The quantity of gas sold showed an increase of 6·1% upon the quantity sold during the preceding year. The corresponding increase in the quantity sold by Subsidiary Gas Undertakings was 3·7%. The Directors have decided to extend the supply of gas from the Association's Works at Box Hill to the rapidly growing districts of Blackburn and Mitcham, in Victoria.

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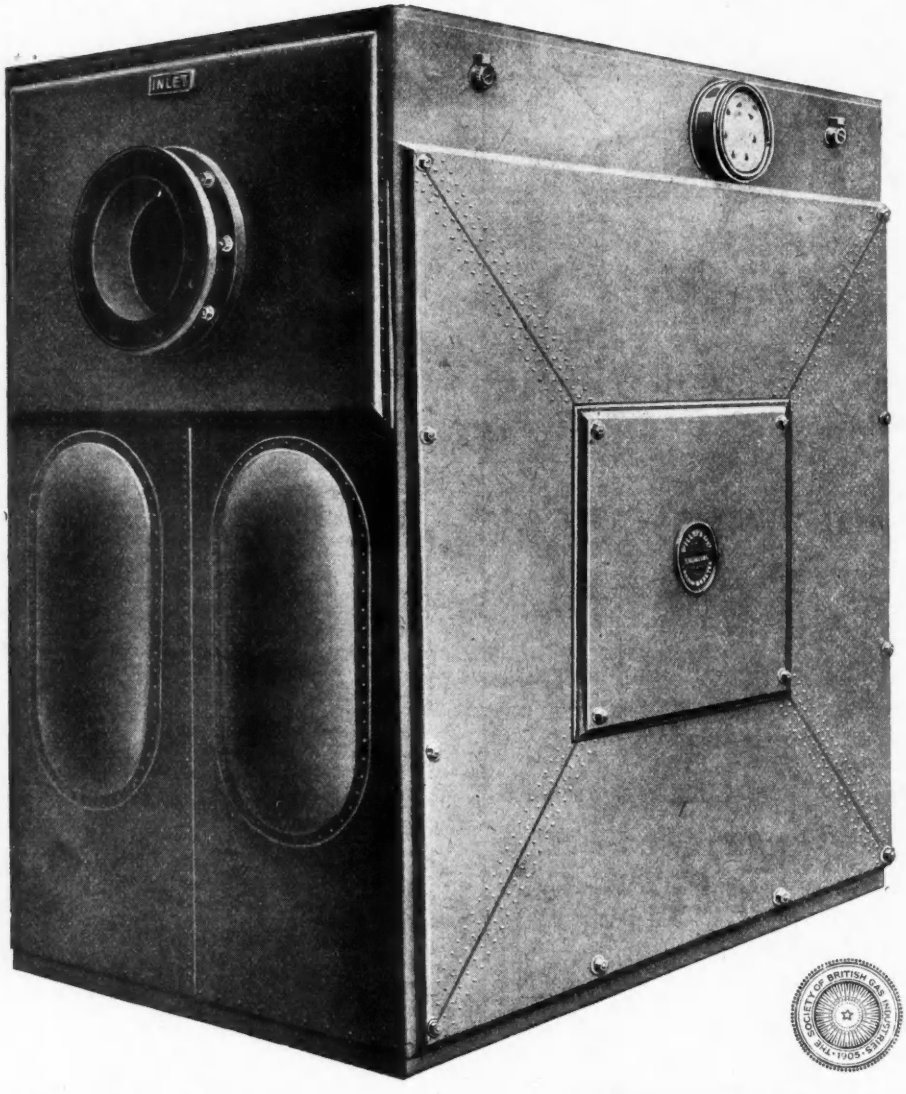

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Gas Markets & Manufactures

Current Sales of Gas Products

The London Market for Tar Products

Jan. 3.

Prices of Tar Products in the London market remain steady at the following levels:

Pitch, 38s. per ton f.o.b.
Creosote, 5⅞d. to 6d.
Refined tar, 3¼d.
Pure toluole, about 2s. 4d.
Pure benzole, 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, about 12s.
Prices are per gallon naked at makers' works.

Tar Products in the Provinces

Jan. 3.

The average prices of gas-works products during the week were: Gas-works tar, 25s. to 30s. Pitch—East Coast, 38s. to 40s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 38s. to 40s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅞d. to 4½d.. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 9d. to 4s. Naphthalene, £14 to £17. Salts, 80s. to 85s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland

GLASGOW, *Dec.* 31.

There is still very little new business being arranged, but it is anticipated that early in the New Year buying must resume in fair volume.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch remains on offer at 30s. to 32s. 6d. per ton f.o.b Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Being the "off" season very little is being arranged, but prices are held at 3d. to 3½d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—There are some large orders about to be placed, and prices are steady as follows: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6d. to 6¼d. per gallon; neutral oil, 5d. to 5¼d. per gallon, all *ex* works in bulk.

Cresylic acid.—The lack of new business is having a disturbing effect, but meantime values are as follows: Pale, 97/99%, 3s. to 3s. 3d. per gallon; dark, 97/99%, 2s. 9d. to 3s. per gallon; and pale, 99/100%, 3s. 6d. to 4s. per gallon; all *ex* works in buyers' packages.

Crude naphtha continues to command 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha, 1s. to 1s. 1d. per gallon.

Motor benzole is unchanged at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—Prices are nominal at 11s. to 12s. per gallon for 90/160 grade, and 12s. to 13s. per gallon for 90/140 grade.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole..	0	9½	to	0	10	per gall. at works
Motor „ ..	1	3	„	1	3½	„ „ „
90% „ ..	1	4	„	1	4½	„ „ „
Pure „ ..	1	8	„	1	8½	„ „ „

Contracts Advertised To-Day

Pipes and Connections.
Sidmouth Gas Department. [p. 76.]

Railway Lines.
Lincoln Gas Department. [p. 76.]

Retorts.
Teignmouth Gas Department. [p. 76.]

Stores.
Blackpool Gas Department. [p. 76.]

Overseas Opportunities

Johannesburg

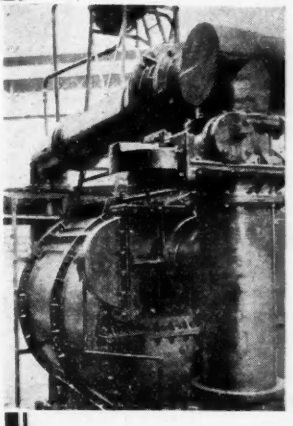
H.M. Trade Commissioner at Johannesburg reports that the Union Tender and Supplies Board is calling for tenders (No. 585) for the supply and delivery of a quantity of pipes, spigot and socket, 3¼ in. by 3 metres, or 3½ in. by 9 ft., and necessary bonding clips. Alternative quotations are required for cast or spun iron pipes. Tenders endorsed "Tender No. 585 Post Office," should be addressed to the Secretary, Union Tender and Supplies Board, 271, Visagie Street (P.O. Box 371), Pretoria, by whom they will be received up to 9 a.m. on Feb. 3, 1938. (Ref. T. 32034/37.)

Diaries, Calendars, &c., Received

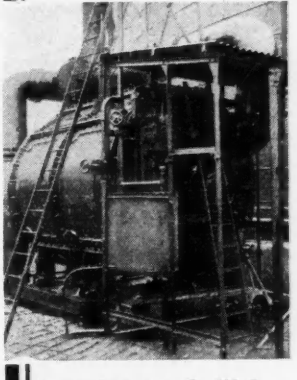
Seasonable gifts in the form of diaries, calendars, &c., have been received from the undermentioned friends, whose good wishes are cordially reciprocated:

British Jeffrey-Diamond, Ltd., Wakefield.
Brotherton & Co., Ltd., Leeds.
Chemical Trade Journal, 265, Strand, W.C. 2.
Gale & Polden, Ltd., Argyll Street, W. 1.
Harris & Pearson, Ltd., Stourbridge.
Haycock Press, Ltd., Camberwell Road, S.E. 5.
Kings Patent Agency, Ltd., Queen Victoria Street, E.C. 4.
Leighton-Straker Bookbinding Company, Ltd., Park Royal, N.W. 10.
Lunt Brothers, Birmingham.
Simon Carves, Ltd., Cheadle Heath, Stockport.
Standard Furnace & Setting Company, Southport
Tarslag (1923), Ltd., Wolverhampton.
Thomas Bugden & Co., Goswell Road, E.C. 1.
Westwood & Wrights, Ltd., Brierley Hill.
Willey & Co., Ltd., Exeter.

When a Joint leaks—



Permac Joints in a Gas Works.



Permac Joints in a Gas Works.

Consider the loss in output while the plant is shut down and the joint is being re-made.
"Permac" the original Metal-to-Metal Jointing makes leak-proof joints that last till you want to break them down. Stands up to all temperatures and pressures. Equally successful on steam, gas, water, oil joints.

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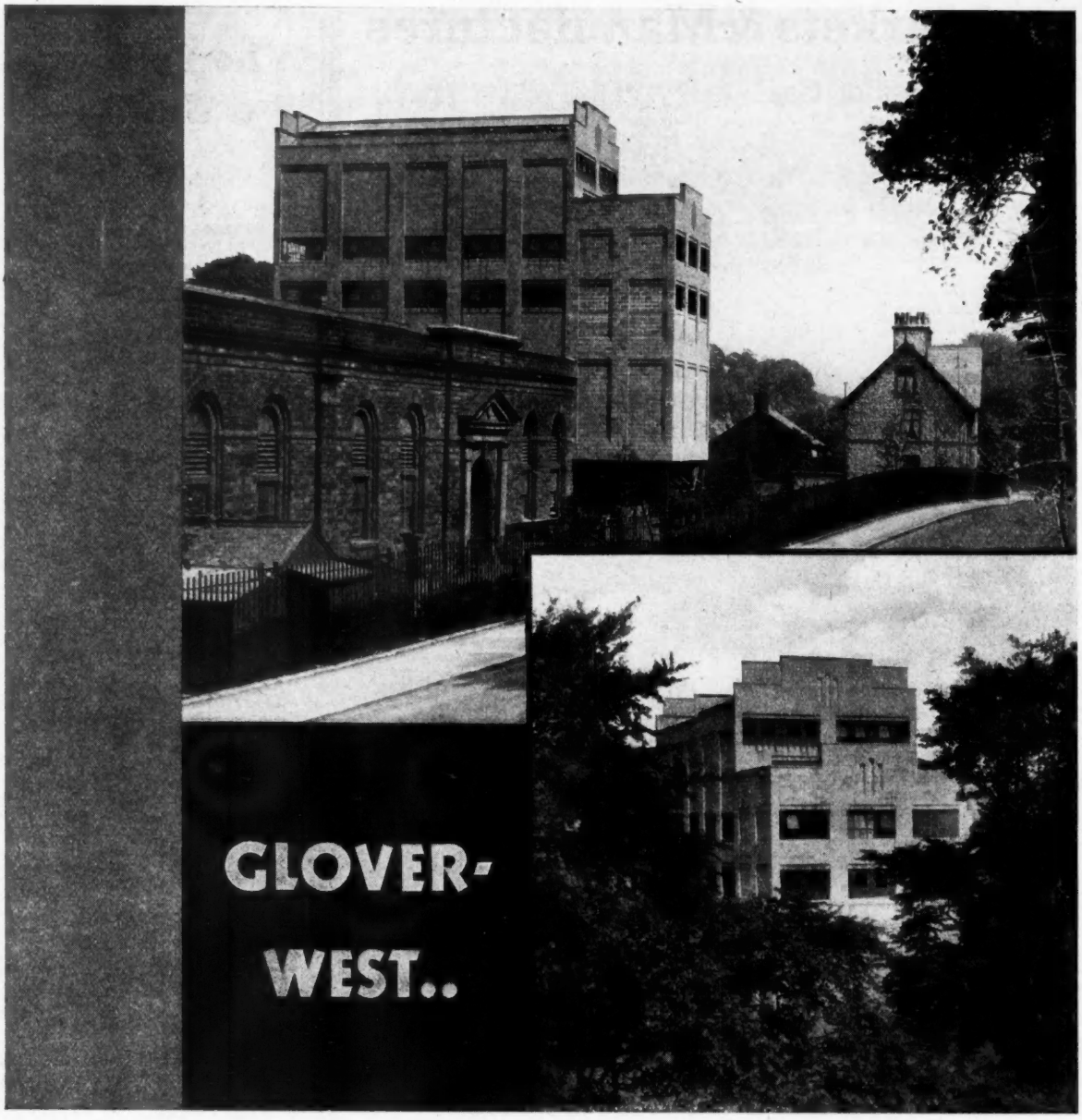

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MANCHESTER: ALBION IRONWORKS, MILES PLATTING ■ **LONDON:** COLUMBIA HOUSE, ALDWYCH, W.C. 2

GAS STOCKS AND SHARES

Markets closed the year 1937 on a note of cheerfulness, though with the exception of the purely investment section business was on a small scale. Prices all round, however, were well maintained, especially in the gilt-edged department, where quotations closed fractionally higher, while the good Christmas traffic receipts gave a stimulus to home rails. Industrials were inclined to be patchy, the leading iron and steel shares being the most favoured. Oils and rubbers were quiet. Prophecies for this year must necessarily be very guarded. So much unfortunately depends upon international affairs, both political and financial, but with every indication that the strong industrial position at home will be maintained markets here should improve.

Business in gas stocks and shares last week was very quiet, though this is not unusual at this time of the year owing to the close proximity of dividend payments, intending sellers preferring to take these before disposing of their holdings. Prices closed unchanged except for a fractional increase in Gas Light 3¾% preference and a recovery of 2 points in Alliance and Dublin 4% debenture.

The prospects for this market during the coming year were commented on in the Review published in last week's "JOURNAL." If there is any consolation in the fact it can be said that, although the capital depreciation of gas stocks during 1937 was in most cases heavy, this was equally the case with many other high-class investment issues, and given some future general rise in values there is no doubt whatever that the gas market would respond accordingly. As will be seen below, the yields at the present time are high for the security offered.

At the time of writing there are parcels of most of the leading "ordinaries" available among which are the following:—

Amount	——	Dividend (1936) %.	Price.	Yield.
				£ s. d.
10,000	Associated Gas and Water	5	20/6 free	4 17 6
1,000	British	7¼	144	5 4 3
3,000	Commercial	5	84	5 19 0
10,000	Gas Light units	£5 12s.	25/3	4 8 9
235	Newcastle units	5⅜	23/6	4 11 0
1,000	Plymouth and Stonehouse ..	8	158 ex d.	5 1 0
500	South Eastern Gas Corporation ..	6	24/6	4 18 0
2,000	South Metropolitan	5½	103	5 6 10
5,000	South Western Gas and Water Corpn.	5	19/6	5 2 6
5,000	United Kingdom Gas Corporation..	5	20/3	4 18 0

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 31.	Rise or Fall on Week.
1,767,439	Sept. 6	8	8	Alliance & Dublin Ord. ...	158—163	...
374,000	Dec. 13	4	4	Do. 4 p.c. Deb. ...	95—100*	+2
558,890	Aug. 9	7	7	Barnet Ord. 7 p.c. ...	158—163	...
300,000	Oct. 4	1/9⅝	1/4⅛	Bombay, Ltd.	26/—28/—	...
179,915	Aug. 9	9½	9½	Bournemouth sliding scale ...	200—205	...
590,407	,,	7	7	Do. 7 p.c. max. ...	158—163	...
493,960	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...
50,000	Dec. 13	3	3	Do. 3 p.c. Deb. ...	78—83*	...
262,025	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	115—120*	...
357,900	Aug. 9	7½	7½	Brighton, &c., 6 p.c. Con. ...	150—155	...
649,955	,,	6½	6½	Do. 5 p.c. Con. ...	133—138	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	127—133	...
855,000	Sept. 20	8	7	British Ord.	139—144	...
100,000	Dec. 13	7	7	Do. 7 p.c. Pref.	140—145*	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115*	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100*	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107*	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...
100,000	22 May'33	6	4	Cape Town, Ltd.	1½—2½	...
100,000	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1½—3½	...
150,000	Dec. 13	4½	4½	Do. 4½ p.c. Deb. ...	77—82*	...
626,860	July 19	6	6	Cardiff Con. Ord.	125—130	...
237,860	Dec. 13	5	5	Do. 5 p.c. Red. Deb.	106—111*	...
98,936	Oct. 4	2/-	2/-	Colombo Ord....	1⅝—1⅞	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.	23/6—25/6	...
739,453	Oct. 4	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/—	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/—	...
1,775,005	Aug. 9	5	5	Commercial Ord.	80—85	...
620,000	Nov. 29	3	3	Do. 3 p.c. Deb. ...	73—78	...
286,344	Aug. 23	5	5	Do. 5 p.c. Deb. ...	113—118	...
807,560	Aug. 9	7	7	Croydon sliding scale... ...	140—145	...
644,590	,,	5	5	Do max. div.	110—113	...
620,385	Dec. 13	5	5	Do. 5 p.c. Deb.	112—117*	...
239,000	Aug. 9	5	5	East Hull Ord. 5 p.c.... ...	98—103	...
185,355	Aug. 9	6	6	East Surrey Ord. 5 p.c. ...	120—125	...
176,211	Dec. 13	5	5	Do. 5 p.c. Deb. ...	112—117*	...
250,000	Nov. 15	7	4	Gas Consolidation Ord. ...	19/6—21/6	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	18/6—20/6	...
19,255,284	Aug. 9	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	24/6—25/6a	...
2,600,000	,,	3⅛	3⅛	Do. 3½ p.c. max. ...	83—86	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref.	100—103	...
2,993,000	July 5	...	3⅜	Do. 3⅜ p.c. Red. Pref.	101½—103½	+½
8,602,497	Nov. 29	3	3	Do. 3 p.c. Con. Deb.	78—81*	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb.	112—115	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb.	110—113	...
700,000	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb.	98—101	...
270,466	Aug. 23	6	6	Harrogate New Cons. ...	115—120	...
157,500	April 5	1/2⅝	1/2⅝	Hong Kong and China Ord	1—1½	...
213,200	Aug. 9	6	6	Hornsey Con. 3½ p.c. ...	118—123	...
5,600,000	Nov. 1	12	8	Imperial Continental Cap. ...	135—140	...
223,130	July 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
285,242	Aug. 9	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...
11,751	Aug. 23	10	8	Maidstone 5 p.c. Cap.... ...	180—190	...
63,480	Dec. 13	3	3	Do. 3 p.c. Deb. ...	70—75	...
75,000	Nov. 29	†10	†10	Malta & Mediterranean ...	145—155	...
				Metropolitan (of Melbourne)		
392,000	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—103	...
231,978	Aug. 23	5	5	M.S. Utility 'C' Cons. ...	101—106	...
968,657	,,	4	4	Do. 4 p.c. Cons. Pref.	96—101	...
360,075	Dec. 13	4	4	M.S. Utility 4 p.c. Deb. ...	97—102*	...
148,955	,,	5	5	Do. 5 p.c. Deb. ...	112—117*	...
675,000	Nov. 15	†9	†6	Montevideo, Ltd.	85—90	...
250,000	Aug. 9	7½	7½	North Middlesex 6 p.c. Con.	147—152	...
396,160	Aug. 9	5	5	Northampton 5 p.c. max. ...	110—115	...
300,000	Oct. 18	†7	†9	Oriental, Ltd.	153—158	...
468,537	Dec. 13	8	8	Plymouth & Stonehouse 5 p.c.	154—159*	...
621,667	Aug. 9	8½	8½	Portsmouth & Gosport Cons.	164—169	...
241,446	,,	5	5	Do. 5 p.c. max. ...	104—109	...
73,350	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...
247,966	Dec. 13	4	4	Primitiva 4 p.c. Cons. Deb. ...	95—100	...
625,959	July 5	4	4	Do. 4 p.c. Red. Deb. ...	94—97	...
15,000	Sept. 6	6	6	San Paulo 6 p.c. Cum. Pref. ...	9—9½	...
441,275	Sept. 20	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	21/6—23/6	...
460,810	,,	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
133,201	Aug. 23	5	8½	Shrewsbury 5 p.c. Ord. ...	130—135	...
9,000	June 7	4	4	South African Ord.	3⅜—4⅜	...
1,371,752	Sept. 6	1/2⅝	1/2⅝	South East'n Gas Cn. Ld. Ord.	23/—25/—	...
871,636	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/—	...
498,818	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/—20/—	...
450,000	Aug. 9	4	4	Do. 4 p.c. Deb.	99—102	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...
6,709,895	Aug. 9	6	5	South Met. Ord.	101½—103½	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pf. ...	131—136	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	...
1,895,445	Dec. 13	3	3	Do. 3 p.c. Deb. ...	74—79*	...
1,000,000	July 5	5	5	Do. 5 p.c. Red. Deb....	110—113	...
1,543,795	Aug. 9	6	6	South Suburban Ord. 5 p.c. ...	120—125	...
512,825	,,	5	5	Do. 5 p.c. Pref....	110—115	...
500,000	,,	4	4	Do. 4 p.c. Pref....	95—100	...
250,000	,,	...	§18/9	Do. 3½ p.c. Red. Pref.	98—101	...
888,587	Dec. 13	5	5	Do. 5 p.c. Deb....	113—118*	...
250,000	,,	4	4	Do. 4 p.c. Deb....	97—100*	...
200,000	Sept. 20	...	3½	Do. 3½ p.c. Red. Deb.	94—99	...
427,859	Nov. 1	1/2⅜	9⅜	S. Western Gas & Water Ord.	18/6—20/6	...
160,523	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	19/6—21/6	...
110,000	Dec. 13	4	4	Do. 4 p.c. Red. Deb. ...	97—102*	...
750,541	Aug. 9	5½	5	Southampton Ord. 5 p.c. ...	111—116	...
148,836	Dec. 13	4	4	Do. 4 p.c. Deb. ...	96—101*	...
350,000	Aug. 23	5½	5½	Swansea 5½ p.c. Red. Pref. ...	110—115	...
94,000	June 7	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
1,076,490	Aug. 9	6⅜	6⅜	Tottenham and District Ord.	132—137	...
409,835	,,	5½	5½	Do. 5½ p.c. Pref....	121—126	...
62,235	,,	5	5	Do. 5 p.c. Pref....	109—114	...
371,850	Dec. 13	4	4	Do. 4 p.c. Deb....	97—102*	...
85,701	July 19	‡6	6	Tuscan 6 p.c. Red. Deb.	96—101	...
888,629	Oct. 4	6	4	U. Kingdom Gas Cor. Ord....	19/6—21/6	...
937,743	Nov. 15	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/—	...
500,000	,,	...	-/1·15	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/-	...
745,263	Dec. 13	4½	4½	Do. 4½ p.c. 2nd Non-Cum.Pf.	16/6—18/6*	...
1,000,000	Sept. 20	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...
373,939	Aug. 9	7	7	Uxbridge, &c., 5 p.c.	138—143	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...
1,371,138	Aug. 9	7	7	Wandsworth Consolidated ...	140—145	...
2,525,768	,,	4	4	Do. 4 p.c. Pref. ...	99—102	...
1,343,964	Dec. 13	5	5	Do. 5 p.c. Deb. ...	113—118*	...
383,745	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	...
558,342	Aug. 9	7	7	Watford and St. Albans Ord.	140—145	...
200,000	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref. ...	121—126	...
200,000	Nov. 29	4	4	Do. 4 p.c. Red. Deb.	95—100	...
100,000	,,	3½	3½	Do. 3½ p.c. Red. Deb.	94—99	...

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 31.	Rise or Fall on Week.
202,152	Sept. 6	25/–*b*	5	Ascot Ord.	100—105	...
128,182	Dec. 13	5	5	Do. 5 p.c. Pref.	108—113*	...
573,156	Nov. 15	5	5	Assd. Gas and Water Ord. ...	19/—21/–	...
167,506	,,	...	-/4*c*	Do. 4 p.c. Red. Cum. Pref.	19/—20/–	...
253,118	,,	...	4	Do. 4 p.c. Irred. Pref. ...	18/—20/–	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/–	...
500,000	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
31,035	Aug. 23	...	-/4½	Associated Utilities 4 p.c. Pref.	16/6—18/6	...
100,000	Dec. 13	...	3½	Do. 3½ p.c. Red. Deb....	95—100*	...
17,000	Aug. 23	8	8	Bognor Orig. Ord. 'A' ...	160—170	...
62,210	,,	8	8	Do. New Addl. 'A' ...	160—170	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	141—146	...
37,440	Aug. 9	10	10	Cam. Univ. & Town10 p.c. max.	193—203	...
125,970	,,	7	7	Do. 7 p.c. max.	135—140	...
39,025	,,	5	5	Do. 5 p.c. max.	98—103	...
65,000	Aug. 9	8½	7½	Eastbourne 'A' 5 p.c. ...	158—163	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	128—133	...
112,312	,,	5	5	Do. 5 p.c. Pref.	108—113	...
130,000	Dec. 13	5	5	Do. 5 p.c. Deb.	113—118*	...
24,000	Aug. 23	8½	8½	Great Yarmouth 8½ p.c. max.	44—49	...
59,400	,,	7½	7½	Do. 7½ p.c. max.	34—39	...
51,160	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125*	...
152,600	Sept. 6	9	8	Guildford Cons.	170—175	...
54,055	,,	5	5	Do. 5 p.c. Pref.	110—115	...
68,250	Dec. 13	5	5	Do. 5 p.c. Deb.	112—117*	...
156,600	Aug. 23	7½	7½	Hampton Court Cons. ...	158—163	...
73,620	Sept. 6	8½	8½	Luton Cons. 'A'	163—168	...
107,960	Sept. 20	5½	4	Mid Kent Ord.	8½—9½	...
230,940	Aug. 9	10	10	Oxford & District Ord. ...	205—210	...
47,112	,,	5	5	Do. 5 p.c. Pref.	108—113	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	110—115	...
126,193	Nov. 15	7½	7½	Peterborough Ord.	158—163	...
64,990	Sept. 6	7½	6½	Redditch Ord....	125—135	...
166,850	Aug. 9	8	8	Romford Ord....	155—160	...
60,000	,,	4	4	Do. 4 p.c. Pref.	97—100	...
44,000	Sept. 20	5	5	Do. 5 p.c. Deb.	113—118	...
25,570	Aug. 9	5½	5½	Rugby 5½ p.c. Pref.	125—130	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...
42,750	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125*	...
10,950	Aug. 23	8	8	Ryde Ord.	158—163	...
270,086	Sept. 6	7	7	Slough Ord.	135—140	...
21,000	Dec. 13	5	5	Do. 5 p.c. Deb.	110—115*	...
28,872	Nov. 1	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/–	...
28,866	Sept. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
137,730	Aug. 9	7	7	Southgate & Dist. 7 p.c. max.	140—145	...
62,500	,,	5	5	Do. 5 p.c. Pref.	110—115	...
117,228	Aug. 23	5	5	Swindon Cons.	106—111	...
60,425	Dec. 13	5	5	Do. 5 p.c. Deb.	110—115*	...
64,380	Dec. 13	5	5	Torquay and Paignton 5 p.c. Pf.	108—113*	...
33,858	Nov. 15	...	-/2·70*c*	United Kingdom Gas Corpn. 4½ p.c. 1st Cum. Pref. ...	20/—22/–	...
130,000	Aug. 9	8	5	Wakefield Ord.	120—125	...
81,650	,,	5	5	Do. 5 p.c. max.	103—108	...
82,000	Aug. 9	6	6	Weymouth Ord.	103—108	...
98,384	Aug. 9	6	6	Wolverhampton 6 p.c. Pref....	120—125	...
160,000	Dec. 13	5½	5½	Do. 5½ p.c. Rd. Db.	107—112*	...
90,000	Dec. 13	5	5	York 5 p.c. Red. Deb.... ...	104—109*	...
133,640	July 19	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	128—133	...
120,000	,,	5	5	Do. 5 p.c. Pref.	108—113	...
35,000	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	121—126*	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Dec. 31.	Rise or Fall on Week.
347,756	July 19	6	5	Bath Cons.	120—122	...
1,667,250	July 19	5	5	Bristol, 5 p.c. max.	116—118	+½
120,420	Dec. 13	4	4	Do. 1st 4 p.c. Deb. ...	99—101*	...
217,870	,,	4	4	Do. 2nd 4 p.c. Deb. ...	99—101*	...
328,790	,,	5	5	Do. 5 p.c. Deb.	118—121*	...
274,000	July 19	5	5	Newport (Mon.) 5 p.c. max....	100—105	...
13,200	Sept. 6	8	7	Pontyp'l Gas & W. 10 p.c. 'A'	13—14	...
13,600	,,	6	5	Do. 7 p.c. 'B'	11½—12½	...
40,000	,,	6	5	Do. 7 p.c. 'C'	11½—12½	...
140,778	Aug. 9	5	5	Weston-super-Mare Cons. ...	110—112	...
64,338	June 21	4	4	Do. 4 p.c. Deb.	96—98	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	157—160	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Dec. 31.	Rise or Fall on Week.
157,150	Aug. 9	6½	5	Chester 5 p.c. Ord.	104—109	...
92,500	Dec. 13	4	4	Do. 4 p.c. Pref.	96—100*	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	88—91*	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101*	...
2,167,410	Aug. 23	6	6	Liverpool 5 p.c. Ord.... ...	125½—127½	...
245,500	Dec. 13	5	5	Do. 5 p.c. Red. Pref. ...	99—104*	...
306,083	July 1	4	4	Do. 4 p.c. Deb. ...	102—104	...
106,280	Aug. 9	10	10	Preston 'A' 10 p.c.	206—216	...
188,219	,,	7	7	Do. 'B' 7 p.c.	147—157	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Dec. 31.	Rise or Fall on Week.
122,577	Aug. 9	8	8	Blyth 5 p.c. Ord.	165—166	...
732,000	Aug. 9	5	5	Hartlepool G. & W. Cn. & New	112—114	...
2,061,315	Aug. 9	5¾	5	Newcastle & Gateshead Con.	23/3—23/9*a*	...
682,856	,,	4	4	Do. 4 p.c. Pref. ...	98—100	...
776,706	June 21	3½	3½	Do. 3½ p.c. Deb. ...	90½—91½	...
277,285	Nov. 1	5	5	Do. 5 p.c. Deb. '43...	103—105	...
332,351	Aug. 23	6	6	Sunderland 6 p.c. max. ...	139—141	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Dec. 31.	Rise or Fall on Week.
542,270	Aug. 9	9	6	Derby Con.	135—145	...
55,000	Dec. 13	4	4	Do. 4 p.c. Deb.	100—105*	...
20,000	Dec. 13	5	5	Long Eaton 5 p.c. Pref. ...	10—12*	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110*	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Dec. 31.	Rise or Fall on Week.
10,000	Sept. 20	10	10	Great Grimsby 'A' Ord. ...	210—220	...
6,500	,,	10	10	Do. 'B' Ord. ...	210—220	...
79,000	,,	10	10	Do. 'C' Ord. ...	205—210	...
1,806,339	Aug. 23	6	6½	Sheffield Cons.	144—148	...
95,000	July 5	4	4	Do. 4 p.c. Deb.	100—103	...

a The quotation is per £1 of Stock. *b* Actual for Quarter. *c* Actual. * Ex div.

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